

# Flight Surgeon's NEWSLETTER

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No. 1-67

(This material is for the information of Navy flight surgeons only and does not necessarily reflect endorsement by the Navy or the Naval Aviation Safety Center.)

## FLIGHT PHYSICAL HANDOUT

The following handout for squadron aviators was authored by LT C. R. MOCK, MC, USN, of NS Newport. The article was sent us by LCDR Vincent L. KNAUS, USN, of the Naval War College. (See also "The Flight Physical," November, 1966 Approach on the same subject.)

### I. Introduction.

This rambling discourse is prompted by my gradual realization that most aviators are not well informed about flight physical examinations. And, being men after all, they are apprehensive about the unknown rigors of subjecting themselves to the scrutiny of those frustrated near-aviators, the friendly Flight Surgeons. Medical practice has changed in recent years from treatment of the end stages of disease to preventive medicine. Asymptomatic patients are examined in an effort to detect disease in an earlier and more curable stage. Please be convinced that the flight surgeon's responsibility is to keep as many aviators healthy and flying as possible, and the last thing he would want to do is threaten your "Wings of Gold."

An aviation physical examination is a thorough general examination with particular emphasis on eyes, ears, respiratory and circulatory systems. The following "talk-through" of a physical is to remove some of the mystery and hopefully allay some anxiety about the annual.

### II. Laboratory Studies.

The chest x-ray is to reveal present and past lung disease, and aids in evaluating the condition of the heart, diaphragm, ribs, and spine. The routine blood test is only to screen for syphilis. Many conditions affect the urine, such as diabetes. The electrocardiogram evaluates the electrical forces generated by the heart and helps to pick up early indications of heart trouble. As you visit the "shot room" to see if your immunizations are current, you probably will receive a skin test to screen for tuberculosis.

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## III. The Examination.

Part of your physical examination will be done by an "AVT." An aviation technician is a hospital corpsman who, in addition to the usual training in the care of patients, has completed additional schooling at Pensacola. Usually the following items are tested by the AVT (and reviewed or rechecked by the medical officer).

Visual acuity is tested by seeing what is the smallest line of letters that can be read correctly. Incidentally, 20/20 means that the individual can read at 20 feet a line of letters the height of which subtends an angle of five minutes at 20 feet. 20/30 means the individual at 20 feet reads letters which subtend an angle of 5 minutes at 30 feet, and so on. We hope the selection process has picked people who will have 20/20 distant vision for 20 years, but there are allowances in the standards for changes in vision, so be honest. You just can't squint through a whole flight, so if you need glasses, get them and use them. A complex gadget of wheels, prism, and lights tests eye muscle balance. This is to make sure your eyes won't let you down under conditions of fatigue and make you see double. Accommodation is the ability to focus on a near object, and is tested by measuring on a ruler how close a small card of letters can be read. This distance for close reading regularly and predictably increases with age and usually only indicates if an aviator will need glasses to help read his cockpit instruments. Depth perception depends on many visual factors, but, if you have passed the initial flight physical, you should have no trouble with this one.

Blood pressure and pulse measurements reveal certain facts about the heart and blood vessels. A "blood pressure" consists of two numbers, e.g., 120/80. The higher number and the lower number reflect the pressures (in mm Hg) on the walls of blood vessels at the peak and ebb of each cycle of the pump (heart); the values indicate such factors as elasticity of the blood vessel walls, peripheral resistance to blood flow and others. One of the most common causes of elevation is anxiety about taking a physical.

The audiogram measures the threshold of sound pressure at various frequencies, or that minimum loudness which is just audible. Aviation personnel are constantly subjected to noise hazards. The energy of loud sounds can permanently damage the nerve of hearing, first causing a loss of receptors for high tones.

A new device recently sent to aviation medical facilities is the "integrated anthropometric device." Soon, this device will be used to obtain a series of body measurements on the 25th and 30th birthday physicals, and if none has been done before on the individual. These measurements will be used to help define the ranges of size of "normal" man and to provide data to more realistically design cockpits with the human animal in mind.

The remainder of your physical is done by a flight surgeon. A flight surgeon is a medical officer (who may be a generalist or a specialist) who has attended an intensive six month course in medicine as applied to aviation. He also goes through part of pre-flight, so that he gets an introduction into what the student aviator has to go through. Like all flying personnel, he goes through the survival and swimming courses. Finally, he goes through the same "A" stage of flight training as the student naval aviator, suffers the same anxieties, and says the same prayers for rain. After soloing, he gets an abbreviated "B" stage of acrobatics and instrument flying. Although the popular opinion is that this training is "so the flight surgeon can land the plane if the pilot gets sick," it is done so that the FS has a knowledge of the stresses on the aviator and can better understand his problems.

To describe a complete examination takes volumes, but the following high points are areas of the exam which generate the most questions. The close scrutiny of the eyes with the light held very close enables one to see directly the blood vessels and nerves of the retina. Glaucoma is checked by applying a weight with a scale to the anesthetized cornea. This measures the pressure of the fluids within the eyeball. Glaucoma is a common cause of painless gradual blindness, and is periodically tested for after age 35 years. The nose is examined for polyps and obstruction. The ears, mouth, neck, heart, lungs, abdomen, spine, nervous system, extremities, and skin are all examined for early evidence of disease. The rectum and prostate are examined because this is a common site for cancer in men. This is usually examined after age 40 years, but there are indications for doing it earlier.

Additional studies, x-rays, lab tests, and consultations with other specialists are obtained as necessary, if problems are found.

I have always been impressed with the amount of hardship an aviator will put up with to perform his duties. I have also been impressed with the devious lengths to which he will go to avoid seeing a medical officer. Since you are forced to get a physical, if at no other time, this is the time to bring up your complaints, no matter how minor. It is clear that the purpose of the periodic physical examination is to detect early signs of disease before the process becomes irreversible.

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LET'S KEEP IN CONTACT

INTREPID: INTREPID, with CVW-10 aboard, returned to Norfolk in late November after a very successful eight-month deployment to the South China Sea as an attack carrier. The Air Wing (the Navy's only all attack-squadron Air Wing) achieved outstanding results while operating from Dixie and Yankee Stations. A high point occurred in September when two A-1's from VA-176 ("The MIG-Killers") were credited with one confirmed and one probable MIG-21 during a dog-fight near Hanoi. Although many aircraft were hit by small arms and AA fire, only three were shot down and two of these three pilots were successfully rescued.

For relaxation, the "Fighting I" visited Yokosuka and Sasebo, Japan, Hong Kong, and Subic Bay, Phillippines. During its 12,970 mile return voyage home via Singapore, the Indian Ocean, Suez Canal, and the Mediterranean, INTREPID was successfully purged of all slimy pollywogs by Davey Jones and his crew of noble shellbacks during an Equator crossing near Singapore.

The Medical Department consisted of CDR L. H. Blackburn (SMO), LT. O. D. Moore (surgeon), LT Dave MacMillan and LT Jerry Robinson (DVW-10 flight surgeons), LTJG George Zink (medical administrative officer), and 26 corpsmen. Although new records were set for sick call visits and all clinical support divisions, the deployment was singularly free of serious illnesses and injuries. Ninety-four patients from other ships were seen in consultation; emergency cases required three helo transfers to other ships by the flight surgeons, and one highline transfer.

After a 75,000 mile deployment, Pier 12 never looked better!

--L. H. Blackburn  
CDR, MC, USN

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ESSEX: There are three flight surgeons aboard ESSEX (CVS-9), myself and two from the Air Group, CVSG-54. In addition, we have an assistant medical officer, who is the ship's surgeon, LT Frank R. Gudas, MC, USN, is the senior of the two Air Group flight surgeons, graduating from Class 110 at Pensacola Medical School, interned at the Marine Medical Center in Portland, Maine, and after completing the program at Pensacola, was assigned to CVSG-54 which is located at NAS Quonset Point. Dr. Gudas works mainly with the helicopter people in HS-5. LT William D. Graham, MC, USN, is the other CVSG-54 flight surgeon, a graduate of University of Rochester Medical School and Class 111 at Pensacola, becoming a designated flight surgeon in April 1966. He works mostly with the fixed wing squadrons, VS-22 and VS-32 in CVSG-54. I consider both of the Air Group flight surgeons excellent to outstanding doctors in all respects.

We have a reasonable "routine" aboard ESSEX, most of the time. We have quarters daily at 0745, with a brief medical staff meeting, when we discuss various problems, the Plan-of-the-Day, and other matters. We do our aviation physical examinations usually from 0800-1000, while our corpsmen are screening morning sick call; we also see the "overflow" or problems referred by the experienced corpsmen. The remainder of the day is filled with consultations, appointments, or meetings. Each Air Group flight surgeon spends at least 50%, usually more, of his time with the squadron people in the ready rooms, flight deck, hangar deck, shops, ward-room, etc. This ensures, we hope, a good relationship of the flight surgeon with the aviation people. Our routine day at sea ends at 1730, after evening sick call (1600). We have three to five patients in the ward spaces at any one time - these are usually victims of the "bumps and bruise brigade," the severe sprains, or fractures, sustained by men moving around the ship. Our surgical load has been light; however, we did evacuate a sick patient from a destroyer for acute appendicitis.

All in all, we are busy supporting the ship and Air Group in its mission of anti-submarine warfare. Morale is good. We would welcome any visitors, anytime.

--E. York  
LCDR, MC, USN

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#### CERTIFICATION IN AVIATION MEDICINE

(The following is a handout from the Bureau of Medicine and Surgery.)

Requirements of the American Board of Preventive Medicine for Certification in Aviation Medicine are:

1. Preventive Medicine and Public Health -- 1 academic year.
2. Residency in Aviation Medicine -- 2 years.
  - a. Approved and supervised clinical and field practice or research.
3. Practice of Aviation Medicine -- 3 years.
  - a. Approved clinical and field practice, research, or training.

## U. S. Navy Plan

1. Academic schooling
  - a. School of Aviation Medicine to designation as Naval Flight Surgeon -- 6 months.
  - b. Preventive Medicine and Public Health, civilian university -- 1 academic year.
2. Residency in Aviation Medicine
  - a. Rotating residency -- School of Aviation Medicine -- 24 months.
3. Practice in Aviation Medicine
  - a. Approved field and fleet practice -- 30 months.

## OUTLINE OF THE NAVY SIX YEAR PLAN

## I. Academic Schooling

The first phase is the basic regular course leading to the designation of Naval Flight Surgeon. This course, of six months' duration, is conducted at the Naval School of Aviation Medicine, Pensacola, Florida, and classes convene thrice each year. The course familiarizes the student with the application of the clinical specialties to aviation medicine, the aerospace equipment utilized, and actual flight training. Those students who are physically qualified and successfully complete the flight syllabus are permitted to solo.

## II. Practice in Aviation Medicine

The second phase is one of 24 months or more of general Aviation Medicine practice. Prospective candidates for the Boards would have the privilege of requesting billets that would offer the required opportunities. In general, the majority of the billets to be filled by men at this level of training would be operational billets with the fleet and with the Marines.

## III. Postgraduate Training

The third phase is one of an approved graduate course in Preventive Medicine at an acceptable civilian university leading to the degree of Master in Public Health. It shall consist of an academic year of schooling in the principles and practices of preventive medicine.

## IV. Residency Training Period

The fourth phase shall be one of 24 months under direct supervision of the School of Aviation Medicine. It is believed that in this phase, recognition of individual preferences should be taken. From experience it is known that young medical officers vary in their specific interests in the general field of aviation medicine. It is proposed to recognize this variation

by allowing special research on a project of their choice during the program. The training is a mixed type with rotation through the departments of ophthalmology, otolaryngology, neuropsychiatry, cardiology, aviation physiology, and work at a U. S. naval hospital on various medical and surgical services. Field trips to the Naval Aviation Safety Center, Armed Forces Institute of Pathology, Aerospace Crew Equipment Laboratory, and the Aviation Medical Acceleration Laboratory are scheduled during the residency. Upon completion of this phase, and provided a total of six years have elapsed since commencement of the first phase, the individual is eligible for examination by the American Board of Preventive Medicine in Aviation Medicine.

#### Application

Applications for residency training in aviation medicine should be made by means of an official letter, addressed to the Chief of the Bureau of Medicine and Surgery, and forwarded via the chain of command. Applications must be submitted in time to reach the Bureau by 1 July of the year preceding commencement of desired training. The BUMED Professional Advisory Board will consider the initial application for residency training as being an application for the entire period required to become Board eligible in the specialty. For further details, applicants are referred to BUMED Instruction 1520.10C.

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# Flight Surgeon's NEWSLETTER

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## THE MOR

Every flight surgeon should review his responsibilities as a member of an aircraft accident board and be prepared to perform them in an effective manner. A majority of the MOR's submitted to the Safety Center reflect a thorough medical investigation with logical conclusions and recommendations. Ideally this should be 100% but such is not the case. MOR's are submitted which are incomplete, contain inaccurate data, conflict with portions of the AAR and to be bluntly frank, are just downright poor.

Following are some of the commonly encountered faults:

1. Failure to take part in the deliberations of the aircraft accident board. OPNAVINST 3750.6E very clearly states that the flight surgeon member will be an active participant in board deliberations. From a review of some MOR's it is evident that the flight surgeon was not communicating with other board members. No doubt there is a multiplicity of reasons for such a situation ranging from language barrier to inability to locate the meeting spaces of the board. This lack of exchange of information leads to conflicting reports, invalid conclusions and recommendations and poor data.

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which significantly influence statistics on which much of the safety effort is focused.

2. Inaccuracies. A very common occurrence is to find gross variations in factors which appear in the MOR and the AAR. To cite an example -- A pilot ejected from an aircraft at 500 knots and this was properly recorded in the AAR. The accompanying MOR stated that the airspeed at ejection was 0 knots! In addition, there was several thousand feet difference in the altitude of the ejection recorded in the MOR and AAR. Improper designation of personal flight and survival gear, ejection seats and rescue equipment is another problem area. Not only does this influence the evaluation of specific items but also puts an additional load on already overburdened personnel who must spend unnecessary time straightening out these errors.

3. Incomplete reports. Too frequently where specific information is called for in the report there is nothing recorded or it is so generalized that a guessing game arises in trying to determine what is the definitive answer. The submission of an addendum or correction is a "rare bird" even when important information is discovered after the MOR has been submitted. The concept that the case is closed after the MOR has been forwarded should be completely discarded. This is particularly true in accidents of undetermined cause.

4. Poor reports. MOR's which can be categorized as unsatisfactory are quite small in number. Lack of effort, failure to follow accident investigation guidelines and disregard of existing instructions, constitute the principle factors underlying a poor MOR. Although there is no magic remedy for the first factor, the latter two can be eliminated by referring to the wealth of material covering the medical investigation of aircraft accidents and following the appropriate instructions.

After thoughts... Did you pass the ORI? Following are some informal verbal comments received regarding the performance of several flight surgeons in the investigation of accidents:

Squadron ASO: "He didn't know anything about the personal equipment and how it worked." Squadron skipper: "He gave one lecture at an APM at my request and hasn't been around since. How can he make such a statement about -- or anyone else in the squadron? It has to be hearsay and not through personal contact." Senior board member: "The flight surgeon member never did visit the accident site. In fact the only time I saw him was when he came over to sign the AAR. It was obvious that there was no interest and very little effort on his part." Pathologist: "I did the autopsy without any idea of the circumstances of the accident. The flight surgeon never attempted to contact me. If I had known more about the case the additional studies would have been done."

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REDUCED G TOLERANCE AFTER CESSATION OF SMOKING

A 31 year old Naval aviator, a gunnery instructor in a jet training squadron, suddenly noted reduced G-tolerance in the gunnery pattern. He almost completely grayed out at 3 - 3 1/2 G's even while wearing a G-suit. Although he was in good health and had no other symptoms, he had quit smoking two days earlier. His decreased G-tolerance was attributed to a relative lack of circulating nicotine or other vasopressors he had been absorbing from tobacco smoke. After decreasing his gunnery hops for a few days, he resumed pulling normal G-loads with no return of symptoms.

It is suggested that jet pilots who stop smoking be warned to watch for a transiently reduced G-tolerance.

--LT K. C. YOHAN, MC, USN  
VT-4, NAS Pensacola

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A RESCUE INCIDENT IN THE USE OF THE U. S. ARMY ROPE SLING

Some months ago, a Marine aviator safely ejected from his A-4E Skyhawk aircraft which had reportedly struck a ridge line during a low-level bombing mission. The aerial observer received a report that the pilot was uninjured and requested evacuation. An Army UH-1D helicopter within the immediate area responded to the call.

The crew of the UH-1D helicopter lowered a rope with a 2-foot diameter loop through the jungle canopy while hovering for approximately 3 minutes according to the rescue pilot's statement. The crew chief observed the Marine aviator to look up and smile and assumed that he was safely in the loop. The personnel aboard the rescue aircraft were unable to communicate with the downed aviator due to difficulty with the guard frequency. The pilot was reported to be in a semi-crouched position either standing in the loop or sitting astride a large knot in the rope. The helicopter was not equipped with a winch to pull the pilot into the helicopter. The method of rescue is normally to lift the pilot being rescued from one point to another point of safety. The rescue helicopter climbed to approximately 300 feet above the highest tree and began to descend along the ridge line to the rice paddies in the valley below, never exceeding 25 knots indicated air speed or 6600 r.p.m. The Marine aviator was observed to make 6 slow revolutions initially and then face in the direction of flight. Approximately 90 seconds from the time of pick-up, he was observed to abruptly release his grip on the rope and fall backward into a boulder-strewn river bed some 200 feet below. The possibility exists that the pilot may have used the sling improperly because of lack of familiarity with it. His body was recovered by another helicopter.



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Several factors may be derived from the incident relative to the use of the Army rope sling. There is a need to familiarize members of the other Armed Forces in the use of the sling. One possible method for utilizing the sling is to have the lower end of the loop across the back with the rope underneath the individual's armpits. Additional security is provided by crossed hands position holding the upper part of the loop. The recommended method may not be applicable in cases where the individual being rescued has sustained an injury to any portion of the upper extremities. The choices remaining are to change the use of the sling by any possible method allowed by the injury or if circumstances permit, to wait for a better equipped helicopter for rescue. The Army rope sling consists of a 100 foot manila-nylon rope of 5/8" or 3/4" diameter. The lower business end is a two foot diameter loop formed by a secure bowline knot with a series of smaller knots spaced at 18" intervals to about 6 feet above the initial knot for use as a handhold. The inboard end is securely attached to the helicopter structure and equipped with a quick release attachment. The U. S. Army rope sling has certain dangers for rescue purposes. There is a need for a standard piece of equipment for use among the different services for rescue purposes. Along with this need is the proper indoctrination of all members of the Armed Services in the use of this rescue equipment. Another factor contributing to the incident is the need for improved means of communication between those on the ground and their aerial observers or potential rescuers.

All the time, effort and expenses involved in the improvement and the enforcement of procedures mentioned will certainly be of immeasurable value if it results in the saving of one life.

Action is being taken to correct and improve the deficiencies noted in this rescue incident.

This communication is one of the preliminary attempts to familiarize all aviation personnel to the use of the Army helicopter rescue sling.

--CAPT J. J. ZARRIELLO, MC, USN  
(From 1stMAW AVSAFBUL No. 15)

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LET'S KEEP IN CONTACT

USS INDEPENDENCE (CVA-62): No one enjoys Christmas away from home and the Medical Department of the USS INDEPENDENCE is no exception. The current Med Cruise has been both pleasant and professionally stimulating with visits to the interesting ports of Cannes, Barcelona, Naples, Istanbul, Malta, Beirut, Genoa, Palma and Livorno and the Task Force has



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presented a wide variety of medical problems since we relieved AMERICA on 1 July.

Only one of the "Big I's" five physicians was aboard on the previous WESTPAC cruise. After three years' residency training at the Johns Hopkins School of Hygiene and Public Health and the Naval Aerospace Medical Institute in Pensacola and certification in Aerospace Medicine by the American Board of Preventive Medicine, CDR Herb Britton reported aboard in July to relieve CDR Bill Dempsey as Senior Medical Officer. LCDR Alfred Taricco, our surgeon and assistant medical officer, reported aboard in August and took part I of the American Board of Surgery exams on board ship while anchored in Palma.

Our three air wing flight surgeons are DR. A. P. Cohen, DR. G. H. Purvis, DR. J. A. White. Al Cohen has been with CVW-7 for two years and is leaving the Navy in April for an Anesthesiology Residency at the Medical College of Virginia.

When the air wing disembarks in February, Gene Purvis will return to Beaufort, S. C., with his squadron (VMA-324) while Jim White will go to NAS Oceana.

With our Sixth Fleet deployment approaching an end the "Big I" heads homeward for an extended yard period and all of us anticipate our return to CONUS.

--CDR J. H. BRITTON, MC

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U. S. Naval Station, Kodiak, Alaska: The Naval Station, Kodiak is a rather peculiar sort of duty for flight surgeons. It is a Naval Station, not a Naval Air Station, but it has runways, hangars, etc. We have three airplanes, (one HU-16 and two C-54s) used mostly for shuttling between Kodiak, Anchorage, Seattle and Adak. However, much more air activity is carried on by the Coast Guard with helicopters, C-123 and HU-16s which they use for logistic flights to their various tiny stations in the Alaska area, search and rescue, ship surveillance and training. The U.S.C.G. has no flight surgeons here but does have one hospital corpsman to accompany their SAR flights.

The Naval Station Hospital is staffed by six doctors, two of them being flight surgeons. Their work includes (1) occasional trips on SAR when the anticipated injury or illness may be expected to exceed the capabilities of the corpsman, (2) physical examinations of Navy and Coast Guard pilots and aircrewmembers, (3) examination of applicants to aviation training for the Alaska area, (4) investigation of aircraft accidents and incidents, (5) membership of boards relating to safety, proficiency and abilities of personnel, material, equipment and facility. The senior flight surgeon is the Senior

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Medical Officer of the station hospital and is assigned additional duty to the staff of COM-17, COMALSEAFRONTIER, COMFAIRALASKA, the last three all the same Admiral. The junior flight surgeon doubles as the ENT doctor, optometrist and psychiatrist.

The actual demands for duty flying are ordinarily sufficient to provide basic time for pay purposes, but opportunity to fulfill the required syllabus must be obtained on elective flights on the transports - not a very exciting or thrilling way to do it.

The current flight surgeons at Kodiak include CAPT R. R. Bonar and LT D. M. Robinson. No squadron flight surgeon is assigned here as there are no operational squadrons here.

The Naval Station at Adak has the only operating squadron in COM-17.

There are a few Navy installations in the Alaska area which we visit from time to time; a Navy liason with the Commander Alaska at Elmendorf Air Force Base in Anchorage, a communication station operating at Point Barrow during the summer and a Naval Station at Adak. There is no Naval Hospital in this district. For referrals, we utilize the facilities of the Elmendorf Air Force Hospital for military personnel, the Alaska Native Hospital at Anchorage for natives, and civilian hospitals in Kodiak, Anchorage or Seattle for civilians.

There is considerable time after hours, weekends and leave for hunting (deer, bear, rabbits, ptarmigan), fishing (salmon, trout, halibut), crabbing (Dungeness or King) and clamming (huge razor clams)...

--CAPT R. R. BONAR  
MC, USN

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Naval Aviation Safety Center: Work in the Aero-Medical Department of the Safety Center proceeds as usual - reviewing MOR's, writing articles and studying various aspects of flight safety. CAPT R. E. Luehrs remains at the helm, providing leadership, working hard to maintain the HERAP program underway, and studying disorientation accidents for clues to use in a paper for the big meeting on that subject in Johnsville in February. HERAP is a broad new investigation of human error in the flying environment about which a great deal more will be heard in the future. CDR Walt Gable, our aviation pathologist, continues his work in this very special field. LCDR J. R. McTammany is leaving the Center in February to enter private practice in Conway, N. C. and he has been relieved by LCDR George M. Stone who is returning to DIF after six months at the Naval Hospital in Portsmouth, Virginia. LT Charles C. Cole, our aviation physiologist, is actively engaged in two big



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projects, a new anti-exposure suit and underwater egress training, and he recently has been elected president of the Norfolk Navy Flying Club. Plans have been made for many big and important projects in 1967 and all are looking forward to working on them. It is hoped by the staff of the Center that as many flight surgeons as possible will attend the annual meeting of the Aerospace Medical Association this April in Washington, D. C. so that old acquaintances may be renewed.

--LCDR J. R. McTAMMANY, MC

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USS BENNINGTON (CVS-20): USS BENNINGTON will be serving in the West Pac area for an undetermined period of time. The "cruise, visit, and shop" (CVS) capabilities of this antisubmarine carrier are sure to extend our People-to-People program, and I'm sure we'll return with quite a bit of "booty" from the West Pac exchanges.

We have had quite a personnel turnover since our last cruise in 1965. LT V. A. Guardione, MC, USNR, has relieved LT D. C. Geddie, MC, USNR, as assistant medical officer; Doctor Reilly, HS-8 flight surgeon, was relieved by LT A. D. Schilling, MC, USNR; and Doctor Brown, CAG-59 (VS-33 and VS-38) flight surgeon recently left us for civilian life. His relief is scheduled to report at a later date, probably from the January class now at Pensacola. LTJG G. B. Spillman, Jr., MSC, USN, relieved LT H. B. Taylor, MSC, USN, of the medical administrative and supply duties in June 1966.

We have 23 hospital corpsman and four officers (including embarked Air Group personnel) currently assigned to Medical. We are very proud of our department, and we feel that we're well equipped and prepared to handle any situation.

BENNINGTON recently received the Admiral Flatley Memorial Award for Aviation Safety. The Award speaks for itself and indicates the type of ship she is and the high degree of training maintained at all levels.

--LCDR F. D. JONES, MC

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projects, a new anti-exposure suit and underwater egress training, and he recently has been elected president of the Norfolk Navy Flying Club. Plans have been made for many big and important projects in 1957 and all are looking forward to working on them. It is hoped by the staff of the Center that as many flight surgeons as possible will attend the annual meeting of the Aerospace Medical Association this April in Washington, D. C. so that old acquaintances may be renewed.

—CDR J. M. McFarland, MC

USS BENNING (CVS-20). The BENNING will be arriving in the next few days for an undetermined period of duty. The "cruiser, vessel, and ship" (CVS) capabilities of this amphibious carrier are sure to extend our People-to-people program, and it is sure we'll return with quite a bit of "hooshy" from the North Sea.

We have had quite a personnel turnover since our last report in 1956. LT J. A. Gaudin, MC, USN, was relieved by LT J. C. Bodie, MC, USN, as assistant medical officer. LT J. C. Bodie, USN, was relieved by LT A. D. Bonning, MC, USN, and Robert Brown, MD-57 (VS-57) and VS-58. Flight surgeon recruitment for the Korean War is scheduled to begin at a later date, possibly from the Korean War at Fort Belvoir. LT J. A. Gaudin, MC, USN, was relieved by LT J. M. Gaudin, MC, USN, of the medical administrative and supply duties in 1956.

The new 15 hospital, medical and dental services, including the Air Group personnel, are being assigned to the ship. It is very proud of our personnel and we hope that they will enjoy and succeed in their new assignments.

BENNING is located in the Atlantic Ocean, about 100 miles from the coast of Virginia. The ship is a fast ship and the high degree of training maintained at all levels.

—CDR J. M. McFarland, MC

# Flight Surgeon's NEWSLETTER

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No. 3-67

(This material is for the information of Navy flight surgeons only and does not necessarily reflect endorsement by the Navy or the Naval Aviation Safety Center.)

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## TRAINEE TRAPPED IN DILBERT DUNKER

An incident in which a trainee was trapped in a Dilbert Dunker underwater has been reported. As the Dunker submerged, a sudden kink in the oxygen line cut off the oxygen to the trainee's mask. He immediately signalled to the attendant, an ADRAN, and proceeded to release himself from the seat. As he twisted to exit, the straps of his back pack became wrapped around his neck. This plus the fact that he was between the Dunker and the rails made it impossible to raise the Dunker from the water. The trainee states that the ADRAN's rapid and effective action in freeing him from the seat saved his life.

NOTE: Some Dilbert Dunker facilities are already equipped with an oxygen supply and tools (stainless steel) for freeing trapped individuals and are kept on the bottom of the pool under the Dunker.

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## EXCERPT FROM RECENT MOR

"During the course of preparing this report the Health Records of all six deceased men were reviewed. Although the records were generally good,

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there were a few instances in which immunizations were not current, results of physical examinations and sick call visits were not recorded, and other significant information was absent. (No marks or scars were noted on the SF-88 of one of the deceased.)

"It is suggested that all Aviation Medical Examining facilities attempt to insure that all records concerning flight personnel are both accurate and current."

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#### EJECTION - "HOWGOZIT"

The human being was not designed to absorb 17 g's of acceleration applied to the derriere in all cases without failure.

In 1949, (now) CAPT Jack L. Fruin flying a Banshee from NAS Jacksonville was the first person in the U. S. Navy or Marine Corps to eject. He suffered a transverse fracture of his femur. Shortly thereafter, CDR Hugh J. Tate repeated the event under similar circumstances and developed deep bruises with discolorations from the back of his knees almost to his belt line. These were the first ejections in the Navy and injury did occur. Both officers returned to active flying, thankful that the ejection seat prevented their being struck by the empennage on evacuating the cockpit.

The philosophy behind the fabrication of this ejection system was as follows: The hands were raised to grasp the handles of the face curtain pulled down from overhead for three reasons:

- (1) To prevent flailing of the arms in the windblast.
- (2) To prevent face and head injury from windblast and from blast-initiated head and neck movement.
- (3) To align the body in an upright position.

The body restraint system was employed to anchor the pilot to the seat in what was considered to be the optimum body position for acceptance of the propulsion force from below. The idea of ejecting a person from a high performance aircraft was:

- (1) To remove him from the aircraft.
- (2) To prevent bodily injury.

At the present time this philosophy remains unchanged. Although a great

multitude of changes of the systems have been made over the years, the basic problems with their attempted solutions are essentially the same. The mechanism of forcibly removing a person from an aircraft and decelerating him sufficiently (initial acceleration may be necessary) to allow survivable contact with the earth's surface still is fraught with inherent potential failures.

Such maneuvers as ducking the head to reach the handles or "submarine-ing" (sliding out from under the lap belt), in many instances will result in anterior compression fracture of the vertebral bodies by increasing the forward bending of the spine. Further, the mass of the arms and hands as well as survival equipment on the front of the body will exert a "moment arm" equal to the distance from the center of gravity of the body multiplied by the mass which will tend to bend the spine in anterior flexion.

With the application of force to the ejection seat, the body will go or attempt to go in directions other than along the thrust axis of the seat because a large portion of the body does not lie in or in line with the center of gravity (through which the thrust axis lies) and hence will resist upward movement on the stroke.

Restraint of the body to nullify movement away from the thrust line is absolutely necessary if broken backs are to be eliminated. The best restraint would be a plaster of Paris body cast encompassing the head and flexed thighs as well. Short of this, straps applied to prevent body movement will to a lesser degree assist in distributing the ejection force to all parts.

It seems clear that if the human body in the sitting position is to have significant acceleration applied from below upward then the best arrangement of the vertebrae would be in their normal thoracic and lumbar curvatures with the thighs flexed on the trunk at the 90° angle.

Increasing age provides increasing likelihood of back fracture on ejection. Fractures of types other than those of anterior compression do occur, but in lesser numbers.

In compiling and reporting statistics on ejections there are many sources of error. The reported altitude for instance is in most cases estimated and the estimates are made by the ejectees, wingmen, ground observers and others. Considerable variation among observers is usually found. The altitude given in the official report, obtained from whatever source, is the one reported in these statistics. Statistical fatalities are likewise suspect because the ejectee has 30 days following the event in which to qualify for a fatality stamp but the accident report is submitted in less than half that time.

Injury on ejection is also conjectural as to timing and cause. An aircrewman could be injured (and the back broken) prior to ejection, as in midair collision. He could be injured on ejection initiation, during the stroke, during the air blast entry, opening shock of the parachute, let down phase or on striking the ground or being dragged along it. There are records of fracture occurring in each time frame listed. Many other errors creep in which are impossible to eradicate.

Some highlights on recent ejections are given below:

In the 1964 summary a comparison was made between 1958 and 1964 ejection success rates. These years were chosen because 1958 was the last year before the advent of the "low level" seat capability, and because the overall number of ejections and fatalities was practically identical for these two years. A particularly disturbing fact which emerged was that the low-level success rate (below 500 ft.) was approximately 50% for each year, in spite of the low-level capability of the modern seats.

The 1965 picture is brighter. Of the 41 ejections below 500 feet, 32 were successful for a success rate of 78%. Even more encouraging is the fact that 70% of ejections initiated below 100 feet were successful.

Although 1966 figures are not all in or confirmed, the following appear to be the case for those known:

Out of 81 ejections below 500 ft., 74 aircrewmen survived for a rate of 91%, 12 ejections of a total of 20 below 100 ft. were successful and the nearly ground level ejections were six in number with three being successful.

In conclusion, the matter of ejection seat success or failure in survivability or injury is a highly complicated subject. There are very few, if any, "concretes" for rather numerous factors and variables, all of which enter in, must be considered in context. In any consideration of survivability one fact emerges. If the time required for the operation of the ejection seat-parachute system is equal to or less than the time available from the initiation of propulsion to the pilot's contacting the surface of the earth in his parachute terminal velocity, then the ejection will most probably be survivable. If otherwise, the reverse will most probably be true.

Ballistic, ballistic with rocket assist, and pure rocket systems are in use today in the Navy. Unusual methods of pilot extraction such as a "Yankee" system, in which the pilot is yanked out by the shoulder straps, are being applied to the part of the inventory of aircraft. Pure rocket ejection systems have been, are and will be relied on to assist the ejectee in survival and prevention of injury. Regardless of altitude, air speed and attitude, and

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assuming perfect functioning of an ejection seat-parachute combination, if the time allowable to the ejectee from leaving the cockpit to striking the earth is within the time required by the operation of the system, survival is almost assured.

( $T_a = \text{or} > T_r$ ) is the probable success formula where  $T_a$  is time available and  $T_r$  is time required.

---CAPT R. E. Luehrs, MC, USN  
Head, Aero-Medical Department  
Naval Aviation Safety Center

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#### LET'S KEEP IN CONTACT

USNAS LOS ALAMITOS: I have been here at NAS Los Alamitos, the largest of the stations of the Naval Air Reserve Training Command, since 25 September 1963, when I relieved CAPT Dick Phillips. I am ably assisted by LCDR Ronald J. Lentz, MC, USN (flight surgeon) and LT Sheldon A. Lippe, MC, USNR, and a fine group of corpsmen. Administrative details are taken care of by LT James D. Quick, MSC, USN. LT Joseph G. Sever, MC, USNR is due to report from Adak shortly as relief for LCDR Lentz.

At present we have five Selected Reserve medical officers who are very helpful to us on weekends. We hope to increase that number shortly.

It is a very active station, with Selected Reservists coming from as far away as Arizona and New Mexico. It is located in the fantastically growing Los Angeles-Long Beach megalopolis, with residential development crowding to the edge of the field. This situation produces some problems. There have been fairly frequent complaints of jet noise and recently an A-4 crashed on a street in an adjacent residential area (with damage to buildings, but miraculously, no injuries to people), but for the most part the civilian population understands the importance of our mission and is glad to have us here.

The medical department is extremely active, with large numbers of physical examination, a busy sick call, and a busy dependents clinic. Routine dependent care is limited to dependents of station personnel, but much "emergency" care is given to others. The new Long Beach Naval Hospital, to be commissioned next month is only 4 1/2 miles away and we expect it to be of great help to us.

---CAPT A. E. Morris  
MC, USN

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NAS REAM FIELD: Ream Field, the "Helicopter Capitol of the World," is located at Imperial Beach, Calif. just south of San Diego. We have six helicopter squadrons, one of which is usually deployed to Southeast Asia. Here at the dispensary, in addition to sick call and routine physicals, we see about 800 dependents per month. The U. S. Naval Hospital, San Diego, takes care of all our obstetrical cases, as well as other consultations in the various specialties.

Our flight surgeons are: Bob Steiner (HC-1), Steve Wertheimer (HS-2), Ted Cook (HS-4), Bob Stemsrud (HS-6), Tony Schilling (HS-8), and John Dickinson (HS-10). Bob Stemsrud just recently returned from Southeast Asia, Tony Schilling just deployed, Steve Wertheimer will deploy in March, and John Dickinson will begin a dermatology residency in July at the U. S. Naval Hospital, San Diego.

We at Ream invite any of our flight surgeon friends who might visit this area to "drop in and see us." We offer only the finest in hospitality!

---LCDR D. P. Hoback  
MC, USN

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USS KITTY HAWK (CVA-63): With roughly one-third of our combat cruise completed, KITTY HAWK personnel have almost entirely recovered from 10 days R and R at Subic Bay, P. I., and we are now about a week into our second period "on station." Surprisingly, the first period (30+ days) on Yankee Station in the Gulf of Tonkin resulted in minimal pilot fatigue; morale was high and losses were low. It was anticipated that with improved weather and increased combat tempo we would be tested somewhat more severely, and if this past week is any indication, we will have predicted correctly.

During the late spring and the summer months, while the KITTY HAWK was at its home port of San Diego, there was a complete turnover of ship's medical department officers:

Our senior medical officer, CAPT Seldon C. Dunn, MC, USN (just recently promoted), reported aboard in June 1966 after a three-year tour in England as an exchange flight surgeon to the Royal Naval Air Medical School. He was followed shortly thereafter by LT Richard A. Stayton, MSC, USN, who came to us from the Naval School of Hospital Administration, Bethesda, Md. The ship's surgeon, LCDR Clifford M. Herman, MC, USN arrived aboard in July after having finished a general surgery residency at the USNH Bethesda.

The air wing flight surgeons, LT Ben C. Bowen, MC, USN and LT John F. Murphy, MC, USN, are currently serving their second combat deployment aboard the KITTY HAWK, and by now both can be considered to be seasoned carrier air wing flight

surgeons. Dr. Bowen's relief, LT Robert M. Korbolak, MC, USN, just arrived aboard, having traveled to West Pac from Pensacola, Fla., and in a few days, Dr. Bowen's orders will take him to Sicily to be with Fleet Air Wing Eleven.

Life on Yankee Station is not exactly "humdrum" but the interesting events are mostly classified and must be narrated by other means. Moreover, because so far we haven't been in port that frequent or that long, about the only glimmer we get of what it was like to be on a Far East tour aboard an attack carrier during past years is to gather around our elder flight surgeon and listen to him spin yarns about the "good ole days" when the ships spent more time in port than at sea...surely there can't be much truth in those "sea stories"!

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#### THE DOCTOR AND THE PILOT

A Medical Officer's Report on a fatal accident most probably caused by pilot-induced stall/spin contained the following recommendation: "That any pilot who is felt by an examining flight surgeon to be unfit for duty involving flying by virtue of physical illness or prescribed drugs be given an official grounding chit regardless of any statement the pilot may make as to his not being scheduled to fly. This, of course, serves to at least ensure follow-up of the case and might prevent accidents such as this one. In this case, it would have provided an additional chance to examine the pilot and possibly make a diagnosis of a condition of aeromedical significance."

At the time of the accident, the pilot was on TAD undergoing training. Five days preceding the day of the accident, he told his roommate at his home base that he felt as though he was coming down with a "cold." He departed on TAD the following day and on the next day reported at the 0800 sick call, complaining of chills, fever, "stuffiness," and tightness in the chest with a minimal non-productive cough. A chest film and a hemogram were ordered and the pilot was asked to return at 1300 the same day when the results from these tests would be available. His temperature at this time was 100<sup>6</sup> degrees orally.

The chest film was read as within normal limits by the examining flight surgeon (After the accident, the film was sent to NAS -- for reading by the hospital radiologist who concurred with the original interpretation.) The hemogram revealed a hematocrit of 48%, a hemoglobin of 14.5 grams % and a white blood count of 6100. The differential was reported as normal.

When the pilot returned to sick bay at 1300, examination of his ears, nose and throat was completely negative and his lungs were clear to auscultation.

and percussion. There was no cervical or axillary lymphadenopathy. His abdomen was not examined.

The clinical impression was an upper respiratory infection. He was placed on Zactirin tablets, one every four hours as needed; glyceryl guaiacolate liquid, one teaspoon every four hours as needed; and a mixture containing five milligrams of chlorpheniramine maleate and 25 milligrams of ephedrine per 30 cubic centimeters, one teaspoon every four to six hours. The pilot was asked to return to sick all the following morning if his symptoms persisted. He stated that he was not scheduled to fly until the latter part of the week. A grounding chit was not filled out. The pilot never returned to sick call.

On the following day, the pilot complained to his roommate of feeling weak and sick due to a "cold." He was observed to take his medication and spent most of the day in bed. The next morning he again complained of feeling weak and said that he was having hot and cold spells but at 1200 stated that he felt better. That evening he ate a steak dinner and said that he felt much better. He was seen at the officers' club after dinner for a short time; he drank no alcohol and went to bed at 2230. He did not appear ill to his companions that evening.

On the following morning, the day of the accident, he was in the ready room in flight gear for his first familiarization flight in model when the chase pilot arrived at 0545 to conduct the brief. He did not appear to be ill and voiced no physical complaints. After brief, preflight and takeoff, the flight proceeded to the acrobatic area performing maneuvers normally associated with a familiarization flight. The first 30 minutes of the flight were routine in all respects. The pilot, as previously briefed, initiated an approach to a stall in the clean configuration. He commenced a steep climb from 15,000 ft in a wings level attitude and maintained this attitude until the aircraft departed in a flat upright spin to the right. The aircraft recovered after eight to 10 turns in a steep nosedown attitude, but the chase pilot observed the aircraft to reenter the righthand spin. During the spin the chase pilot twice cautioned the pilot to turn off the control augmentation of the automatic flight control system (AFCS). The pilot responded to the second warning, "It didn't work." The chase pilot, orbiting at about 10,000 ft. observed the aircraft to spin until impact. Investigators stated from examination of the ejection seat that "the pilot most probably did not attempt an ejection prior to initial impact."

Autopsy revealed, in addition to injuries, multiple extreme, acute bronchitis and splenomegaly of undetermined etiology which, the investigating flight surgeon states, "raises the question of both viral disease and a more chronic process such as infectious mononucleosis."

Body tissues were forwarded to the Armed Forces Institute of Pathology for routine toxicology studies and drug analysis. Alcohol, carbon monoxide and br

lactic acid results were normal. However, the drug analysis identified chlortrimeton (antihistamine), Zacterin (analgesic) and chloroquin (anti-malarial) in the body tissues. The first two drugs were found in sufficient quantity to indicate that therapeutic doses had been ingested within 24 hours prior to the accident. The chloroquin indicated prophylactic treatment probably was received while on a tour in the combat zone.

"From the evidence gathered, it would appear that the pilot's condition improved to some extent by the time of his fatal flight," the investigating flight surgeon wrote in the MOR. "However, it would seem likely that the pilot was not at his physical best at the time of his flight, and it is considered possible that this could have contributed to improper technique leading to the departure from normal flight, and what is even more likely, impaired the pilot's reaction to the emergency. There is no evidence that the physical illness was such that unconsciousness could have resulted, but there is a good possibility that increased reaction time, diminished G-tolerance, difficulty in remembering procedures and the like could have been a result of the pilot's condition and contributed to his difficulties."

As stated many times before, illness and/or drugs plus flying do not mix. This accident illustrates:

- . The inherent dangers from drugs when piloting aircraft.
- . The importance of mutual understanding between the pilot and the flight surgeon when a drug is prescribed.
- . The pilot's responsibility to check with his flight surgeon before resuming his aviation flight status.

In this case, of course, there can never be any proven connection between the pilot's illness and medication and the aircraft accident. Nevertheless, this pilot should not have been flying.

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# Flight Surgeon's NEWSLETTER

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## PHYSICAL EXAM REQUIRED WITHIN 30 DAYS OF BIRTHDAY

Investigation of a fatal accident turned up the fact that one of the crew members did not have a current flight physical. He had been scheduled for a flight physical prior to being ordered to flying duty. Reasons for his "failure to attain the complete physical" are unknown, an AAR endorser states. Another endorser writes, "Discussion with several flight surgeons reveals that even among the medical community locally, there is no real awareness of the requirement that annual aviation physical examinations be taken within 30 days of the individual's birthday. Compliance with the requirement that the aviation physical examination be passed within the past 12 months of the time duty involving flying is performed is considered sufficient."

Article 15-71, Chapter 15, Manual of the Medical Department, clearly states that the annual physical examination of aviation personnel is to be conducted within 30 days of the individual's birthday anniversary. It further states "unless an aviation physical examination, for whatever reason, coincides within the 30 days of the individual's birthday anniversary, it will not be considered as fulfilling the requirements of the annual physical examination for aviation personnel."

All flight surgeons should be fully aware of the requirements for physical examinations on aviation personnel.

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## SURVIVAL GEAR AND RELATED PROTECTION OF THE AIRCREWMAN

The warm blooded organism basically attempts to return to the liquid from which it originated, namely the sea. In all likelihood this may be the reason for the mass exodus from cities and homes to the beaches, pools, and summer seashore resorts during the warm periods. If the temperature is compatible with the desired comfort, the winds are not of sufficient force to cause hypercooling and discomfort, and no external irritating factor is present, the individual is content in water or a wet condition.

Basically, however, the organism abhors water or wetness when the temperature is of a level so as to produce a noted difference between the environment and the organism itself. It may be predicted then, that the organism will withdraw or, if this is not

possible, will make every effort to protect itself by some means against such a hostile environment to prevent its destruction by an irreversible drop in its temperature.

You would think that if the foregoing statements are reasonably true it should be no great undertaking to indoctrinate, educate and provide adequate protective clothing and gear for aircrewmembers who are constantly and continually exposed to elements and conditions that would cause critical damage and even fatality in the realm of low temperature situations. However, this, unfortunately, is not the case. There are a myriad of individual material, manufacturing, and equipment factors that cloud the issue. In researching various types of squadrons operating in conditions ranging from high temperatures and high moisture levels of the Southeastern Asian area to the very cold areas of the North Atlantic and Iceland, it was generally found to be true that present anti-exposure suits and related equipment are not acceptable and are consequently not being utilized to great extent.

Below are listed some specific and some general statements and conclusions regarding the attitude and acceptance of the Mk-5 and/or MK-5A anti-exposure suits:

- A. Most fighter squadrons utilizing the suit strongly object to the bulkiness of the inner liner. Flights requiring use of the suit and liner are developed so that the suit is donned just prior to flight. When the temperature is 45 degrees or below, the standard liner is used. When the temperature is above 45 degrees, the thermal is worn.
- B. A significant number of aircrewmembers expressed an almost impossible problem in mounting the F-4 aircraft with liner and suit donned.
- C. Tolerability as far as the unvented suit is concerned seems to vary widely with the individual.
- D. VP squadrons of both the East and West Coasts, particularly the P-2 squadrons, are plagued with ventilation problems that understandably create a negative attitude toward the suit. The problem was attacked at Whidby Island, Washington, by the flight surgeon of Patrol Squadron SEVENTEEN who suggested a modification kit similar to that installed in the S-2. The modification kit has apparently solved this problem. During the just completed tour of Iceland by one squadron, the ventilation system pulled ambient air, which was very moist and cold, to ventilate the suits. To someone who might have been perspiring this would be a considerable shock. Also this squadron complained that when outside the plane with no ventilation, the suit was too uncomfortably cold to wear. When the suit is properly donned, the VP squadron pilot experiences a difficult to impossible task of advancing the throttle to takeoff power.

E. Riggers complained that the suit was subject to excessive down time due to zipper and material failure, particularly in the underarm area. The average time of suit usage was judged to be about two months before material failure.

F. In written statements procured by the aviation equipment officer of one squadron, the suit was worn only because it was mandatory and doffed at the earliest possible time.

The negative attitudes encountered must, of course, be carefully considered, but after consulting with the Air Force Survival Unit at Langley Field and the Commander of the British School of Combat Survival and Rescue, some interesting conclusions can be reached. On 16 and 17 March 1966, a Worldwide Symposium on Survival Equipment was held at Langley Field in which this very question of a negative attitude toward the suit was tackled. In discussing the problem with the OIC of the survival school, it was brought out that the same situation exists in the Air Force. Resistance to survival gear seems to be servicewide and even worldwide.

The Air Force has thoroughly tested the Mk-5 series and approved it for its purpose. The difference is the method of insuring that the equipment and gear is utilized.

1. The survival school of the Air Force is very thorough and exceedingly well equipped. An adequate course in all phases of water survival is covered.
2. The Air Force positively controls decisions regarding what gear is to be worn, who will wear it, and when it will be worn.
3. Air Force survival headquarters conclude that the aviator represents an investment of almost a million dollars and should be considered as a national resource and that these aviators, unless specifically assigned to research problems, should not be considered properly qualified to make decisions regarding lifesaving gear that has been experimentally proven and accepted.
4. When decisions on requested waivers on survival gear by squadrons are required, the survival headquarters is consulted and their recommendations usually followed unless extenuating circumstances have altered the situation.
5. Squadron commanders are held rigidly responsible for the proper handling of survival gear. Skeptical individuals are normally ordered to survival school with excellent positive results.

The British School of Combat Survival and Rescue located at Plymouth, England, has a very similar view on survival training for its air force. The wing commander of

this establishment made a statement that very nearly parallels the Air Force view. Survival equipment and survival training should not be and are not the responsibility of the individual aviator or squadron commander but should be directed by higher authority and should be closely adhered to and regulated. The British have developed a very unique anti-exposure suit which seems to be acceptable to the U. S. Air Force and seems worth investigation by the the U. S. Navy if this has not already been done. The suit is constructed in three layers. The outermost is called microporus in that it is permeable to air but not water. When the suit comes in contact with water, it seals itself. The middle layer is of trilox type construction to permit a dead space area for energy insulation. The inner layer is of a slick nylon type which is water-proof. This suit requires no ventilation and is as comfortable to wear as an ordinary flight suit.

Our Allies have apparently developed a different attitude with respect to protective clothing and associated gear. The operator of high performance aircraft and the crewmembers are highly specialized technicians. Their mission is to complete an assignment utilizing a very expensive complex piece of machinery. Without them, the machinery is useless. Aircraft do develop problems and must be landed or ditched in sometimes extreme environments. The machinery can be replaced but the personnel cannot. Therefore, other highly specialized personnel have developed survival equipment to enable the crewmembers to operate other aircraft, and it must be worn unless more sophisticated gear is substituted for it.

OPNAVINST P3710.7B of 10 February 1964, paragraph 825, outlines what and when certain survival gear is to be worn.

--LT C. C. Cole  
Aviation Physiologist

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#### HYPOXIA, DYSBARISM OR SYNCOPE?

While climbing through 26,000 ft during a student training flight in an F-11A, an instructor pilot experienced stomach cramps followed by loss of visual acuity and what the incident report describes as "possible" loss of consciousness. (The pilot remembers nothing until reaching about 9000 ft in a wings level, slightly nose down attitude.) At the onset of the stomach cramps, he checked the aircraft dump valve (closed) and oxygen systems. The oxygen connections were good and regulator switches were in correct position. He did not check the cockpit pressure altimeter or oxygen blinker. He pulled the bailout bottle actuator several times and commenced rapid descent. He feels that he did not get bailout oxygen.

At 9000 ft he realized that he was not functioning normally and immediately returned to home base. He tried to be extra cautious during the remainder of the flight which was uneventful.

After landing, he was taken to the dispensary where lactic acid and carbon monoxide blood levels were drawn and found to be within normal limits. He had had nine hours of sleep the previous night. He had had an "instant breakfast" and, for lunch, a coke, liverwurst sandwich and peanut butter and crackers. He had no residual abdominal complaints after landing.

The pilot had used this same oxygen mask for approximately six months with no previous problems. It was clean and on examination, fitted satisfactorily and functioned normally. The mask seal was satisfactory and had not required reapplication during the previous six months. Considering all the circumstances, investigators felt that while mask leakage was a possibility, it was improbable.

The cockpit dump valve was open at the return of the flight. The pilot states that the dump valve was closed during preflight and when he checked it at altitude. The oxygen regulator valve was on and 100% oxygen selected. A complete check of the aircraft oxygen system revealed no discrepancies. Chemical analysis of the oxygen remaining in both 514 cubic inch oxygen bottles was negative.

Investigators concluded that the bailout oxygen bottle possibly had no oxygen. The bailout bottle pressure indicated over 1800 PSI after the flight. Investigation revealed that the break off nipple was popped and the bottle was empty. The sight gauge cover was removed and it was noted that the indicating needle was disconnected from the bourdon tube. Under these conditions, the report states, the bottle could have been empty and still indicating 1800 plus PSI during preflight. All bailout bottles in the command were inspected for proper security of the needle and no similar discrepancies were discovered.

"No absolute diagnosis can be drawn from this incident," the investigating flight surgeon reported. "However, it is probable that this pilot did suffer decompression and hypoxia. The following possibilities are offered as to the cause:

1. The cabin pressurization system was not working or the dump valve was lodged in the open position.
2. There may have been some leakage around the oxygen mask seal, causing symptoms of hypoxia. This pilot wears his mask comfortable, but not tight. The mask was checked both on and off the pilot's face and it is felt leakage was a possibility but not a probability.
3. There could have conceivably been something temporarily wrong with the oxygen system at altitude which had corrected itself before landing; however, the oxygen system was checked after the flight and found to be normal.
4. The abdominal pain may have been so severe that it caused the visual and mental disturbance without hypoxia having been a factor at all."

"It is quite easy to become complacent with the oxygen system in any aircraft," the squadron commanding officer noted on the incident report. "This command will continually emphasize that oxygen masks should be worn properly and periodic checks made of the oxygen blinker while in flight. Emphasis will also be placed on checking the pressurization during climbout by reference to the cockpit altimeter. Pilots experiencing oxygen problems will be encouraged to:

- |                                   |                                |
|-----------------------------------|--------------------------------|
| (1) Check for tight mask fit      | (7) Make immediate descent to  |
| (2) Check 100% oxygen             | less than 10,000 ft MSL        |
| (3) Select oxygen safety pressure | altitude.                      |
| (4) Check cockpit altitude        | (8) If oxygen contamination is |
| (5) Check oxygen blinkers         | suspected, then actuate the    |
| (6) Actuate bailout bottle        | bailout bottle and turn off    |
|                                   | the main oxygen supply."       |

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#### REDUCING PILLS AND EKG's

An article titled "The Case of the Charted Heart" which the Army Aviation Digest reprinted from the MATS Flyer in June, 1966, has come to our attention. The article reports cases in which abnormal EKGs were recorded on three Air Force pilots, none of whom had heart trouble and all of whom were taking reducing pills without benefit of flight surgeon. (In one case, the pill had been prescribed by a practitioner for the pilot's wife.)

The Air Force flight surgeons investigating these cases sought the help of the regional laboratory of the Federal Drug Administration (FDA). The laboratory definitely identified the culprit drug as digitalis leaf. Two different tablets contained respectively 62 mg and "a moderate amount" of digitalis leaf. Other drugs identified were basically amphetamine derivatives and other less harmful items such as lactose and charcoal.

In one of the three cases, the pilot also had in his possession, in addition to the heart-stimulating reducing pill, six other kinds of non-prescribed pills, one of which was a diuretic.

The dangers of taking someone else's prescription and the fact that flying and medication -- especially medication not controlled by a flight surgeon -- don't mix cannot be overemphasized to your pilots and aircrewmembers. Is it time for you to make another presentation on this subject at your squadron's next APM?

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#### EVALUATION OF HEAD INJURIES AMONG FLIGHT LINE PERSONNEL

It is a known and accepted fact among aviation medicine personnel that head injuries are common among flight line, flight deck and hangar deck hands. The many head-level and foot-level obstructions, the noise of aircraft, and associated equipment, the haste

and confusion associated with air operations and the long, irregular hours often worked, all produce an environment more hazardous than almost any other environment within the purview of industrial medicine. It is because of these dangers that flight deck personnel have recently been included among those who receive hazardous duty pay.

Head injuries seen among these people include abrasions, contusions and lacerations in substantial number; more serious injuries such as fractures, internal hemorrhages, internal damage, and injury or destruction of the sense organs; and, not infrequently, severe crushing or other injuries which result in death.

These injuries are noted and reported in a number of different ways: Most of the minor injuries are not reported, but simply treated and noted in the member's Health Record. Many of these are reported on locally designed accident report forms within various commands or naval districts. Some of the more serious accidents are reported to the Naval Aviation Safety Center, or appear in medical department or naval hospital statistics. Unfortunately, there is no consistent method for this reporting and no central office where all data are obtainable. In fact, as indicated, most of the injuries are not reported at all, but merely recorded in the Sick Call Record or Health Record where they are treated.

Because of these problems of reporting, the data for this study were obtained simply by discussing the subject with a number of naval flight surgeons representing many years of experience at sea and ashore in all types of aviation medicine practice. The information obtained by these inquiries more than substantiates the comments above concerning the extent of injuries. In fact the problem appears to be a significant one, indeed, which has had little attention given to it because it has been around so long it is just more or less accepted.

It is the opinion of most of those queried that some simple, light head gear such as the typical aluminum helmets worn by construction gangs would prevent or minimize the great majority of these injuries. In fact, the senior medical officer of one carrier actually purchased such an item of gear for hangar deck personnel; in the months following, there was a very noticeable reduction in the number of head injuries seen in sick bay.

All agree that such headgear would have to be specially designed for its purpose so that it would not fly off and thus become an object with potential for FOD. Also, the headgear would have to be cool and comfortable in order for it to be well accepted, because so much naval air activity takes place in warm climates.

Such protective equipment would probably not prevent fatalities in such catastrophic accidents as prop strikes and being run over by planes, but estimates are that a substantial number of the less serious injuries would be minimized or prevented completely.

--LCDR Robert McTammany,  
MC, USN

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LET'S KEEP IN CONTACT

USS HANCOCK (CVA-19): HANCOCK is now beginning its third rotational tour off the Vietnamese coast. Currently we're operating as a unit of the Seventh Fleet with KITTY HAWK and ENTERPRISE in the Tonkin Gulf area. The ship is a fine old lady that is proud of having just received a second Navy Unit Commendation for her last deployment. She has the distinction of being the Navy's only ship to receive this award for action in both World War II and Vietnam.

Carrier Air Group Five is aboard with A-1 Skyraiders, A-4 Skyhawks and F-8 Crusaders. These are the fighting members of our team. Two Wing flight surgeons are aboard, LT William D. Stiehm, MC, (Class 110) and LT Edwin S. Protas, MC (Class 113). They are from NAS Miramar and NAS Lemoore.

We had one sailor who fell overboard in our last deployment while he was sleeping on a catwalk on a hot night. He was found nine hours later swimming merrily and healthily along! Another sailor had an arm very successfully reimplanted by LCDR Joe Farrell after it had been avulsed from the shoulder joint. Only a small bridge of skin remained. LCDR William Mathews, MC, gave the difficult and prolonged anesthesia. I understand this sailor is now at USNH Oakland for nerve transplant surgery. Our new surgeon, LCDR Robert Moran, MC, while his time away waiting and whittling on such as hemorrhoids. Bill Mathews was relieved by me and he's now in his aerospace medicine residency training at Harvard.

--CDR W. Richard Jones  
MC, USN

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NAS, ALAMEDA: Even though all its home-ported carriers are deployed, Alameda remains the crossroads of Northern California Naval Air and activity is steady if not frenzied. Notwithstanding the tempo of operations, Alameda's last aircraft accident was in January 1965. There were five incidents in Fiscal 67 and five ground accidents, only one of which resulted in personnel injury, this less than serious.

Fleet Air Alameda remains our most permanently based tenant activity and exercises operational cognizance over squadrons and ships based here. In addition, Commander Carrier Divisions Three and Seven maintain headquarters at Alameda with COMCARDIV 7 on board and COMCARDIV 3 deployed at present.

The Naval Air Station Dispensary boasts six flight surgeons, including the senior medical officer, CAPT R. E. Greenburg, MC, USN, and assistant medical officer, CDR R. H. Tabor, MC, USN. Of these, only two are assigned to tenant activities: Dr. Bill Redfield to COMFAIR and Dr. Bill Pierce to VAW-13 (A-1E's). The remainder are assigned to NAS. Since there are a total of six operating squadrons based at Alameda, four A-1's and one A-4, the VR-30 (COD), the unassigned flight surgeons are endeavoring to furnish the squadrons with aero-medical services. This has been very well received. Each

medical officer has "adopted" a couple of squadrons and makes it a point to spend as much time as possible with each. Dr. Charlie Johnson makes the rounds of VA-145 and VA-215 and Dr. Rick Vidacovich serves VR-31 and NAS and Dr. Tabor makes himself available to VSF-1 (A-4B's) and VA-152. In addition, we all pitch in for a continuing program of physiological training recently set up by station instruction and offered to all comers which covers O&R and NAS pilots as well.

Dr. McDonald is the NARTU flight surgeon and has a busy time thrust upon him upon his return from duty with the Marine Air Wings in Viet Nam.

Drs. Pierce, McDonald, Vidacovich and Redfield have been selected for lieutenant commander.

ORISKANY is in Hunter's Point Naval Shipyard for repairs after her tragedy of several months ago and will soon be back on the line. She has practically a full personnel complement now and to ease the load on her short Medical Department, the Alameda SMO has agreed to furnish a flight surgeon on a TAD basis for about two months.

When ENTERPRISE deployed in November, 1966 with CAW 9 embarked, she was short one flight surgeon. One of our outstanding general medical officers, who has become aviation-oriented, voluntarily leaped into the breach. Dr. J. O. Lee had been on board for a short carqual period and volunteered to serve as erstwhile flight surgeon until the gap was filled. Thus he served well VF 92 and VF 96 from November, 1966, when she deployed to Southeast Asia to 19 January 1967. The squadrons welcomed him and he discharged the position like a veteran. Needless to say, he speaks of our intrepid aviators in glowing terms. We may hear more of Dr. Lee.

--CDR R. H. Tabor, MC, USN  
for CAPT R. E. Greenburg, MC, USN

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NAVAL AUXILIARY LANDING FIELD, MONTEREY: Greetings from the Naval Auxiliary Landing Field, Monterey, Calif. We take great pride in the fact that we have more fully trained naval aviators to support than any other naval air activity with the exception of Pensacola. Our primary mission is to support the Naval Postgraduate School, Monterey and the aviator enrollment is in excess of 700 and increasing yearly.

The staff at Monterey consists of two flight surgeons, three general practitioners (all fully engaged in dependent care), one MSC, three civilian nurses, four civilian clerical types, and 22 hospital corpsmen. I relieved CDR Ted Trumble as SMO in July '66; Ted is currently engaged in the first phase of the aviation medicine residency at the University of California, Berkeley. My assistant flight surgeon, LCDR (Selectee) "Zeke" Niebaum, is in process of seeking an orthopedic residency in civilian life upon his impending release from the service in June. There is still no indication that Zeke's bachelor days are nearing an end.

During the past year, the 10-week Aviation Safety Officer Course was transferred from USC to the Naval Postgraduate School. The facilities for this course are physically located aboard NALF, and the medical-physiological phase is currently being presented by Dr. Dick Mills, a former Navy flight surgeon, now in private practice in Santa Cruz.

After three years at the Naval Air Facility, Washington, D. C., it was a real pleasure to return to California. Monterey's weather and golf courses are even better than advertised. If you are ever in our vicinity, drop by to see us. Bring your "sticks."

--CAPT N. V. White  
MC, USN

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NAS, MIRAMAR: Activity at NAS Miramar continues at a fantastic pace with Air Group departures, arrivals and combat readiness training a never ending transition. The "Home of the Pacific Fleet Fighters" serves as home base for 14 flight surgeons and four "black shoes"; at present six of the flight surgeons are with their air groups in or about the South China Sea.

CAPT Paul Deranian, MC, USN, returned as SMO in July of 1966 following a tour as Force Medical Officer, COMNAVAIRPAC. His second hat, COMFAIR MIRAMAR Medical Officer keeps him and his department firmly entrenched in the aero-medical phases of training and providing medical support for the F-9, F-4 and F-8 pilots of the Pacific Fleet.

Walt Huurman (Class 106) was transferred to Miramar as assistant medical officer in May of 1966 following a tour and West Pac deployment aboard USS HORNET with CVSG 57. NAS North Island, CRAW 12 flight surgeons Russ Baksic (Class 105) and Bill Crawford (Class 108) are very involved in the problems of supplying well-educated, aeronautically adapted and physically qualified replacement pilots and NFO's for the fleet squadrons. In July, Russ will enter an orthopedic residency at Naval Hospital, Philadelphia and Hank hopes to leave the Navy for private practice in Northern California.

Ralph Kiell returns shortly with VF 21 and VF 154 following eight months off the Viet Nam coast aboard CORAL SEA. Woody Hunt (Class 111), did his Viet Nam stint with CAG 15 and returned with his Air Medal in December. Al Balciunas (Class 107) was recently transferred from CAG 14 to VFP 63, having been relieved by Rob Deane (Class 113). Bill Steihm (Class 110) left our midst with CAG 5 aboard USS HANCOCK and Dick Williams (Class 112) deployed with CAG 21, USS BONNE HOMME RICHARD, both in January. Recent arrivals include Blair Edwards (Class 113) CAG 16, Bob Kobelak (Class 113), CAG 11, Vince Frantz (Class 113), CAG 9, and Ed Watts (Class 113), CAG 19. Bob reported aboard USS KITTY HAWK on Yankee Station to relieve Ben Bowen (Class 107) who departed for NAS Jacksonville; Vince joined USS ENTERPRISE also off the Viet Nam coast in relief of Bob McKinlay (Class 111), CAG 19, who is presently with the Marine Corps in San Diego. Ed met and relieved Tom Joas (Class 107) aboard USS TICONDEROGA;

Tom has left the Navy for a civilian anesthesiology residency in San Francisco.

Miramar continues to suffer combat losses and the Medical Department has not been spared. Two of our troops have recently given their lives while in the service of their country. Lieutenant Lloyd Hyde (Class 110) lost his life in the recent holocaust aboard USS ORISKANY deployed off the Viet Nam coast. Lieutenant Nenad Buktenica (Class 109) met with a fatal accident in September, 1966 while returning to Miramar from MCAS Yuma where his Air Group had been deployed for combat tactical training. Their loss is mourned and serves as an added impetus for their contemporaries to carry on in the highest traditions of the Naval Flight Surgeon.

The pace at Miramar is reflected in the statistics released in August 1966 designating this NAS as second only to O'Hare International Airport, Chicago, in total number of operations carried out. In addition to the extensive air-operations supported by the medical department, the dependents' clinic, staffed by four general medical officers, sees approximately 125 patients daily. The proximity of the Naval Hospital, San Diego, for laboratory and consultation services helps ensure a potential for the finest in out-patient medical care.

So as not to allow ourselves to become therapeutically or academically rusty, the staff meets twice monthly for a review of the journal literature carried in the dispensary library. Over light libation, we attempt to set aside Service Group II vs III, and MOR discussions to keep abreast of current medical concepts with a review of eight different journals monthly. Weekends usually find one or two of the staff journeying on an F-9 or F-4 cross country to other parts of the nation, and we generally return to Southern California extremely happy to be stationed in the sunshine.

In addition to medical affairs, this group considers itself among the flyingest of flight surgeons. A dark night frequently finds Bill Crawford airborne as pilot of a VF-121 F-4 with Hank Davis and Russ Baksic guiding VF-126 F-9's in the landing pattern. Rob Deane arrived at his new duty station piloting a recently purchased Mooney 21 and joined Wood Hunt, Al Balciunas and Walt Huerman in a foursome which utilizes Cessna 172's and 210's and T-34's to dispose of duly earned flight pay.

This writer will attempt to keep worthwhile news from Miramar flowing to the Safety Center and looks forward to reading the same from elsewhere.

--Walt Huerman

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# Flight Surgeon's NEWSLETTER

(This material is for the information of Navy flight surgeons only and does not necessarily reflect endorsement by the Navy or the Naval Aviation Safety Center.)

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## NEGATIVE DATA USEFUL IN MOR STUDY

OPNAVINST 3750.6E requires that a Medical Officer's Report be submitted in all Navy aircraft accidents and in certain incidents, ground accidents and other aviation mishaps. This instruction provides no exceptions for submission of the MOR in the case of an aircraft accident. Not infrequently requests are made to waive this requirement, particularly when an accident results from a mechanical failure and there is no injury to the occupant(s) of the aircraft and emergency devices are not used in egress from the plane.

An example is that of a main landing gear strut collapsing on landing with no injury or emergency egress involved but producing sufficient damage to the aircraft to be classified as an accident. On superficial examination it might appear that in such a situation little is to be gained by submitting an MOR. However, this is a false assumption, for comparison data of a negative nature is essential in deriving meaningful answers and statistical information from aircraft accidents.

To illustrate this point, consider the following facts. Landing gear strut failures are relatively common occurrences and can be attributed to a variety of factors. Pilot technique, poor design criteria and metal fatigue failure are some examples of these factors and although any one of them can induce the failure, they represent vastly different mechanisms.

In the case of pilot technique there may or may not be clear-cut medical reasons for such action. Where causative or contributory medical factors exist, it is obvious why an MOR should be submitted even in the absence of injury. On the other hand, where no medical factors can be demonstrated and there is no injury, the reason for submitting an MOR may not be clear. In order to clarify this point, let us examine a hypothetical situation. Suppose in a calendar year there are 25 landing gear failure accidents and these accidents result in one fatality and three injuries. The obvious question then arises - what factors are similar and dissimilar in the fatal and injury accidents when compared with the non-injury accidents? For example, is survival versus non-survival related to anthropometric measurements, the type of survival gear, cockpit design, the landing environment (i.e. aircraft carrier or airfield) or one of a number of other variables? It becomes apparent that the only way to arrive at valid conclusions is to have data for comparison in similar type accidents.

There are a number of additional reasons for requiring negative data but to point out each and every one of these would belabor the point unnecessarily. Suffice it to say that the MOR is the tool with which the medical analyst works out many of the epidemiologic factors in aircraft accidents. Similar to the public health epidemiologist, the analyst identifies problem areas and develops recommendations and methods to provide solutions for these problems. Not infrequently, the recognition of a dangerous trend depends on having a sufficient amount of negative information for comparative study. Seemingly useless reports may contribute in a significant manner to the prevention of death and injury and to the enhancement of operational readiness without the individuals preparing these reports ever being aware of their value. Therefore, it is essential for the flight surgeon to provide information which aids in the improvement of safety in the aviation environment.

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#### SUSPECTED CARBON MONOXIDE CONCENTRATION IN AN S-2F

An instructor and two students were all feeling well at an 0750 takeoff on a syllabus hop in an S-2F. At 0800, at an altitude of from 3,000 to 5,000', the aircraft heater was turned on. At 0850 the aircraft was taken to 9,000'. Five to 10 minutes later, the instructor began to feel somewhat nauseated and asked the students how they were feeling. One said that he had had a headache for 30 minutes and the other noted no difficulty at the time but within five to 10 minutes, began feeling slightly nauseated.

There was no oxygen equipment or pressurization in the aircraft. The heating system had been full open from 0800 to 0900 and the venting system had been closed. The aircraft was brought down immediately with the heater cut off and the overhead vent opened prior to return to home field. When the vent was opened, the student with the headache began feeling better. The instructor and second student felt better soon after landing. Touchdown was at 0915.

The instructor admitted to one cigarette smoked in the preflight brief and one or two during the flight. The students had not smoked before or during the flight. Blood specimens were drawn at 1000. Laboratory findings were that the instructor had a carbon monoxide 9% saturation; the student with the headache, 6% saturation; and the second student, no measurable amount.

The suspected source of carbon monoxide contamination was the aircraft heater, although tests conducted by the squadron were negative.

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#### CORRECTIVE GLASSES AND LIFE

Just recently an incident brought to light a situation that caused us to "probe the literature." A chock man aboard a carrier during a final recovery of an S-2 placed chocks under the port main gear. He was fatally injured when he contacted the port propeller. Incidents like this are not rare, unfortunately, but an additional factor played a role in this one. Several months before the accident, the chock man's visual acuity was found to be 20/100 and 20/50 in the right and left eye, respectively. Corrective lenses were prescribed but he was never seen to wear them on the flight deck. This deficiency in visual acuity was listed as one of the primary causes of the mishap.

During our researching, 16 accidents and incidents in which flight deck or ground personnel were struck by props were found. (One of these involves a bombardier/navigator's misinterpretation of hand signals which was a contributing factor in a mid-air collision. His vision was 20/50 o.d. and 20/25 o.s. No glasses were worn.) It is extremely difficult to accurately isolate visual deficiencies in every case; however, when the record also indicates acute fatigue, we know visual acuity, as well as judgment, is diminished.

As early as 1957, Dr. R. E. Luehrs conducted studies and documented evaluations on visual acuity problems among flight deck personnel. The problem encountered by these men and the penalizing factor of defective vision was evident. As a result, some of these men were removed from flight deck details.

With increasing demands on the fleet and the realization that many excellent personnel may be lost to naval aviation because of slight visual deficiencies, the problem of corrective lenses is becoming more of a consideration.

While the Manual of the Medical Department states the NAOs and B/Ns will wear corrective lenses if needed, we could find nothing which makes it mandatory for flight deck personnel to wear corrective lenses. In the interest of prevention of potential accidents, each squadron flight surgeon might check in his area to see how many flight deck personnel or ground personnel have corrective glasses and are not wearing them.

-LT C. C. Cole, MSC  
Aviation Physiologist

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USE OF THE HOIST IN AIR AMBULANCE OPERATIONS

"Dustoff Control, this is Daddy Longlegs 33, request Dustoff at coordinates YS 123456, two US litter patients, gunshot wounds, category urgent, landing zone not available, over."

The key phrase in the above typical radio call is "landing zone not available." This type call has become very familiar to Dustoff units in the III Corp area in recent months. Up until August of 1966, response to a call such as this would have to be delayed until a landing zone could be prepared or the patients involved could be moved to a landing zone. In many cases this involved too much time, and the patient died. Again, valuable time was lost by units on a combat operation who were required to delay a mission to get the wounded to an LZ. On a few rare occasions the helicopter ambulance was able to lower a rope down through the jungle to the site of the wounded, have them tied to the rope, and lift them to an open area for loading. This was a precarious and dangerous procedure, and definitely not satisfactory. Then in July of this year, both the 254th Medical Detachment (Helicopter Ambulance) at Long Binh, and the 283d Medical Detachment (Helicopter Ambulance) at Saigon Heliport were issued two hoists for their UH-1D aircraft, along with a forest penetrator device for extraction of ambulatory patients, and a folding canvas litter bag device for extraction of litter patients. (This litter carrying device subsequently proved to be too time-consuming for use by untrained personnel, and the old standby stokes litter was used for litter patients.) Initial training in proven techniques of hoist extraction was given to pilots and crews of the 254th by members of the Air Force. The 254th subsequently provided initial training for the 283d.

On 14 August 1966, the first known hoist extraction of a casualty by a US Army medical unit in Vietnam was accomplished during Operation Toledo. CAPT Jorge E. Ortiz-Santiago and WO Angus B. Desveaux evacuated a soldier of the 173d Abn Bde from the jungle area southeast of Xuan Loc. Since that time more than 150 patients have been evacuated by the two Dustoff units using the hoist. The use of the hoist in air ambulance operations has saved numerous lives during this period, extracting casualties from areas surrounded by obstructions ranging from scrub brush to trees 175 feet high, pulling the wounded out of holes barely large enough to squeeze a man through. The most desirable device has proven to be the forest penetrator, which can be utilized for any conscious patient with other than a back or neck injury, and is much faster than using the stokes litter.

Initial experience showed that the hoist operations placed the ambulance aircraft in an extremely vulnerable position, as extended hovering (usually 4 to 12 minutes per operation) at treetop level is required. In order to expedite the operation, training sessions were scheduled with the First Infantry Division, 25th Infantry Division, 173d Airborne Bde, and 11th Cavalry Regiment.

These classes were intended for personnel down to squad leader level, plus medical personnel, and included both a flight demonstration, static display, and lecture. Subsequent hoist operations proved the value of these classes, as ground troops who had attended the classes functioned swiftly and efficiently during the hoist operations.

The hoist can be installed in a UH-1D electrically modified to receive it, in 10 to 30 minutes, depending on crew experience. It can be mounted to the cabin floor of the UH-1D in any of four positions. It has a boom which can be extended to a position just outside the skids when in use. The hoist weighs 151 pounds, and has 256 feet of cable. The cable lowers at a rate of 150 feet per minute, and when loaded to maximum capacity (600 pounds), will raise at 112 feet per minute. Control of the hoist is by the crew chief or by the pilot. Dustoff's experience has shown that a well-trained crew chief, looking out the door and down into the operational area, can do a much better job than the pilot. The pilot has his work cut for him maintaining a smooth, stable hover at altitude. Experience has also shown that less oscillation of the patient occurs if the pilot raises the hovering altitude slightly to break ground with the patient, rather than having the hoist operator break ground. This procedure gives the pilot a gradual transition to the rather drastic center of gravity change which is presented. After the patient breaks ground, the hoist operator then brings him up to the aircraft, and both the crew chief and air ambulance aidman assist in bringing him into the cargo compartment.

Use of the hoist has not been without complications. It is obvious that under optimum conditions, hovering for long periods at treetop level is not a safe practice. Combine enemy activity with the high exposed hover and the air ambulance becomes the proverbial "sitting duck." One Dustoff aircraft has been shot down and completely destroyed by ground fire while on a hoist operation; another has been severely damaged. Ground units tend to rely on the hoist and have requested extractions from areas only 100 meters from a suitable landing zone. It is felt that coordination with supported units will help alleviate this misuse of the hoist. The problem of ground fire will continue, and Dustoff aircraft now ask for a gunship escort for all hoist extractions.

The use of the rescue hoist is another step forward in improved Army Aviation services to the combat soldier and Dustoff is proud to be a pioneer in its use in Vietnam.

--MAJ Charles L. Webb, MSC  
254th Medical Detachment (Helicopter  
Ambulance)  
USARV Aviation Pamphlet, December, 1966

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LET'S KEEP IN CONTACT

NAAS SAUFLEY FIELD: Our Medical Department is staffed with "short-timers." LT H. C. Leake, III, MC, USN, will be leaving for a pediatrics residency at Texas Southwestern in December. LT R. I. Hendra, MC, USNR, will leave in June for a medicine residency at Henry Ford Hospital in Detroit, followed shortly thereafter by LT I. H. Trejo, MC, USNR, who is going to Evanston for an ENT residency at Northwestern. I will be leaving in June for a psychiatric residency at the University of Florida in Gainesville, leaving only LT S. R. Fish, MC, USNR to carry on for another year before returning to a chest fellowship in Boston.

VT-1 continues at its customary frantic pace in an effort to keep up with the ever-increasing demand for young naval aviators. VT-5, in turn, just keeps turning out tail-hookers by the dozen.

--LT Asa L. Godbey, Jr.  
MC, USN

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NAS, POINT MUGU: The Dispensary at Point Mugu has the task of medical support for the Air Station itself as well as for the Pacific Missile Range, the Naval Missile Center and VX-4. As you can gather from the names of the units here, there is a tremendous amount of work going on in the operational and technical evaluation of various missile systems. Consequently, there is ample opportunity for the flight surgeons to learn a great deal about this exciting field.

Our senior medical officer and flight surgeon, CAPT James A. Niforopulos, will be leaving Point Mugu this summer to become the SMO at the NAS Station Hospital Lemoore, Calif. While here at Point Mugu he has been instrumental in setting up the Family Clinic staffed completely with civil service physicians and nurses. The Family Clinic takes care of the dependents on the base allowing the military medical officers to give nearly full time to military medical matters. May I add that this is a unique situation in the Navy and has proven to be extremely successful in meeting the overall medical needs of the base.

CAPT Niforopulos has also been highly commended by the Inspector General (Medical) for his work in the prevention of alcoholism. The Alcoholism Prevention Program on this base, under his direction and guidance, is one of few active and successful programs in the Navy. We all will hear more about his work in the future.

Our three general medical officers, LT Victor Herlacher and LT Ronald Toy and LCDR Roger Quinn, handle all of the ground and air support (non-aviation) personnel on the base. As assistant flight surgeon, I oversee the flight personnel for the Air Station and the Pacific Missile Range. This June, I am being released from active duty to begin psychiatry residency at the University of North Carolina at Chapel Hill.

LT W. Browning is the flight surgeon for VX-4 (Class 110). He is also a designated naval aviator flying the F4 and F8 in operational missile evaluation and testing and development of flight tactics (Sparrow and Sidewinder missiles).

LT R. Hamm (Class 111) is the flight surgeon for the Naval Missile Center. The Naval Missile Center is concerned with the technical evaluation of missiles. He is also a part-time member of the Space and Astronautics Orientation Course (SAOC) home based at Point Mugu but also giving presentations around the country.

We always welcome visitors to the base at Point Mugu. If you are flying by, around or over, stop in, say hello and we'll give you a quick tour of one of the most interesting Air Stations in the Navy.

--LT Paul T. Kayye  
MC, USNR  
(Class 105)

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NAS, CECIL FIELD, FLORIDA: CAPT C. J. Brown writes: Cecil Field is now almost entirely a base for VA types in support of AirLant CVA'S. We still claim VF-13 and VFP-62, however. VF-174, now VA-174, is making great strides with the A-7 aircraft with more A-7 squadrons to follow. The cockpit noise problem is getting extensive attention.

LT Howie Berg recently returned from a WestPac tour and is now assigned to Cecil prior to Navy residency (pathology) in July.

LCDR Bob Bowman will start a Navy orthopedic residency in July 1968.

The Dispensary has been "civilianized" in the past year. That is, the Navy nurse billet and MSC administrative officer billet were both deleted. No serious disruption has occurred. We've all learned a little of the Army way from "Chuck" Horan, the civil administrator who is a retired Army Lieutenant Colonel.

Recently we worked over a transceiver, (PRC-32) to use on SAR frequency to communicate with the helo. This gear, effective to a mile or so, is really for use at a range of a few hundred yards. This is to enable the flight surgeon on the ground to redirect deployment of the helo to solve accident victim aid problems. The PRC-32 is in a small three-pound pack of doctor's useful gear that the responding flight surgeon carries personally on all crash and potential crash responses. By using SAR rather than guard frequency, relatively clear channel operation is possible. Lcdr A. J. Adeeb, CVW-4, has been in charge of this program

which is nearly finished. Additionally he has been involved in an exciting project with Pensacola attempting to establish aviator success predictability factors.

LCDR Adeeb will be relieved by LCDR Jim Boorstin soon.

CAPT C. J. Brown retires on 30 June 1967.

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# Flight Surgeon's NEWSLETTER

(This material is for the information of Navy flight surgeons only and does not necessarily reflect endorsement by the Navy or the Naval Aviation Safety Center.)

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## MEDICAL OFFICER EXPERIENCES DECOMPRESSION SICKNESS IN T-33B

(The following account of decompression sickness experienced by a 32-year-old general medical officer flying as a passenger in the rear seat of a T-33B on a cross country passenger airlift is based on the Air Force's medical report of the incident and the cognizant naval air station commanding officer's endorsement to the Naval Aviation Safety Center. Medical examination of the passenger was done at the Air Force Base which was a refueling stop on the cross country; the passenger's symptoms occurred shortly before reaching this point.)

Following take off on a cross country flight, the T-33B climbed to flight level 280. Time in climb was 30 minutes. Thirty minutes after level off the rear seat passenger began to experience left shoulder pain followed shortly by right knee and thigh pains. Approximately 10 minutes later, he experienced a feeling of nausea and developed "dry heaves." This was followed by numbness of the left 4th and 5th fingers and the palm of his left hand. At this time he told the pilot that he thought he had the "bends."

The pilot performed a cockpit check and found cabin altitude the same as outside altitude. Cockpit trouble shooting failed to locate or resolve this malfunction. A request for a lower altitude due to pressurization problems was made and the flight was cleared from FL 280 to FL 240 with immediate descent following clearance. The pilot queried the passenger concerning his condition and his reply indicated no further problems. The flight maintained FL 240 for an estimated 15 minutes at which time Center cleared the flight to 11,000'. The pilot asked to hold FL 240 for a short while longer since destination was still a distance of 100 NM. The

consideration of landing short of destination was discarded due to the passenger's stated improvement and proximity to destination. (The incident report notes that "although the passenger was not a flight surgeon, an additional consideration in discarding a landing short of destination was the pilot's reliance on the passenger's professional ability to diagnose his own physical condition better than the pilot.")

A descent was started at 80 NM from destination to 11,000' with subsequent vectoring to a routine GCA landing. After the aircraft was parked, the passenger stood by while the pilot completed his aircraft forms. He voiced no complaints about his physical condition. Pilot and passenger then walked to base operations to terminate the flight plan. The next activity was to the lunch counter for sandwiches. Both parties stood in line for five minutes at which time the passenger stated that he would return shortly. During his lunch, the pilot was informed that his aircraft had been repaired and he proceeded to flight plan for the next mission. During the planning, the passenger was observed resting in the base operations lounge. After receiving his weather and prior to filing, the pilot asked the passenger if he was ready to go and received the reply, "Do not feel too good" or words to that effect. The passenger stated that he would like to rest before the next flight.

The next conversation between pilot and passenger was 30 to 45 minutes later when the passenger declared he needed a trip to "sick bay" for medication. Transportation was obtained and the passenger departed for the dispensary. Time elapsed since landing was approximately 2 hours. He presented himself at the flight surgeon's office at 1430 stating that he had had an episode of bends and wanted something for his headache which he felt was vascular in nature.

Examination revealed a pale individual who appeared lethargic and was mentally slow though he was well-oriented and gave appropriate responses. Blood pressure was 128/80 and pulse 52; otherwise the physical and neurologic exams were completely unremarkable. Following this examination he again felt nauseated and vomited. He was admitted to the medical ward for observation where he was placed on bed rest and precautionary IV was started.

The Decompression Treatment Team leader at the USAF School of Aerospace Medicine was then contacted and the above history and physical findings were related to him. It was his opinion that this patient should be transferred to their facility for further observation and compression treatment if necessary. Arrangements were made to transfer the patient to the closest facility with this type of treatment available. He was transported in a T-39 at no time exceeding 2500' absolute altitude. Flying time was 1:40 and the patient experienced no difficulty during flight. His blood pressure palpated, dropped from 110 to 100 during the first hour of flight, then stabilized. Pulse during this time ranged between 48 and 60, finally stabilizing at 60/min.

On arrival, the patient was transferred by ambulance to an Air Force Hospital for further observation by the neurological service. Total time elapsed from pre-

sentation at the flight surgeon's office and arrival at the USAF hospital was 2 1/2 hours. Upon arrival at the AFB, the patient's vital signs were stable, headache and nausea were less pronounced and his cerebation was much clearer. The patient continued to improve and was released for duty the next morning.

Meanwhile, the pilot of the T-33B had been given a physical and had been found free of any indication of altitude sickness.

The aircraft was grounded and inspected. It was found that the accessory airflex duct had blown loose from the accessory airflex tube, apparently causing the inability to pressurize the cabin.

Recommendations from the Air Force medical report on this incident were:

- Reemphasis on the importance of prebreathing 100% oxygen for 20 to 30 minutes in order to denitrogenate prior to takeoff.

- Reemphasis to all pilots the necessity of briefing all passengers on all flights on the use of the oxygen system and other life supporting systems.

- Flight surgeons should inform all physicians of the signs and symptoms of dysbarism and the possibility of delayed neuro-circulatory collapse.

- Physicians having no formal training in flight medicine but who work in the Flight Medical Department due to shortage be taught as much as possible by the experienced flight surgeons and flight medical officers about the problems encountered and survival in an abnormal environment.

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#### LET'S KEEP IN CONTACT

USS ENTERPRISE CVA(N)65 - CVW-9: The Medical Department aboard the "Big E" has been kept busy supporting the flight operations of Carrier Air Wing-9. The medical staff of this cruise is a well-rounded group of five medical officers under the capable leadership of Senior Medical Officer and Senior Flight Surgeon CDR Hank Trostle. Hank is a veteran of two ENTERPRISE WestPac cruises and under his jovial leadership the medical staff rises to any occasion whether at sea or on the beach.

The ship's surgeon, LCDR Walt Beasley is new to WestPac, but he is already brandishing the Bard Parker with great gusto as we carry out many elective and emergency surgical procedures. LT Jim Houser is also making his debut aboard the "Big E" as Radiation Control Officer. His collateral duty is VD Control Officer.

Veteran flight surgeon "Wild Bill" Akins is completing his second WestPac cruise with Air Wing-9. Bill has done a fine job of handling the problems of all our attack squadrons and when not discharging his responsibilities to his squadrons, he doubles as our anesthesiologist as well as handling most of our orthopedic problems. Bill has just recently been honored by being recommended

for the Navy Marine Medal for heroism. This recommendation was made in recognition of his action on Jan 1st, this year, when despite high seas, gusting winds and generally adverse weather conditions, he was lowered in a sling from our helo to the heaving deck of a nearby destroyer where he rendered aid to a critically injured seaman and subsequently supervised helo transfer of the injured man to ENTERPRISE. For these efforts he has also earned the nickname of the "Daring Dangling Doc". In addition to this honor, Bill is anticipating the awarding of his first Air Medal in the very near future. Having had a rather full tour of duty, LT Akins will depart the "Big E" on June 1st to return to civilian life and an orthopedic residency at Tulane in New Orleans.

Yours truly, Rookie Flight Surgeon LT Vince Frantz, reported aboard 13 Jan 67 and I have finally developed my sea legs. As flight surgeon for VF-96 and VF-92, I have been getting my flight time in the rear seat of the Phantom which has been a most impressive experience. When not discharging my duties with the "airdales," I find myself gravitating to the operating room to assist the ship's surgeon or even, on occasion, to "comshaw" a command performance. Having spent one year with "Black Mike" (Dr. Michael DeBakey) as a surgical resident, I still find the lure of the blade almost irresistible. As this cruise nears its end, I am already looking forward to returning with my squadrons to NAS Miramar where I can enjoy my bachelor pursuits in sunny Southern California.

Last, but not least, a deserving note of "thanks" goes to our fine MSC officer, LT Sam Lakey. Sam has done an outstanding job as our chief paper shuffler and has succeeded in keeping us from becoming entangled in our own "red tape."

Greetings from the medical staff of the "Big E."

--LT V. P. Frantz, MC, USNR

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NAAS Fallon, Nev.: NAAS Fallon is the proud possessor of the Navy's longest paved runway. It is situated in the mountainous desert of northern Nevada, and provides target ranges for Pacific coast squadrons. Most attack squadrons (Navy and Marine) on the west coast and an occasional east coast squadron rotate through Fallon for 2-3 weeks at a time for bombing, strafing, and rocket practice.

The dispensary is new and well-equipped and is staffed with two flight surgeons, 15 corpsmen, a civilian nurse and a medical secretary. Since the increase in tempo of operations in S. E. Asia, business has really boomed; this is the stage for the "dress rehearsal" before going to Vietnam. Dependent and retired sickcall has also increased markedly over the past 12 months. This is partly due to Stead AFB, Reno, closing in June, 1966; it is also due to greater numbers of people choosing to move to and retire in Nevada. Nevada is presently experiencing a population explosion similar to that experienced in Southern California 20 years ago. LCDR Chuck Johnston, Class 106, our SMO, returned from Vietnam last May. While there, he was attached to HMM-261. He plans to enter a psychiatry

residency at Oregon University in July. AMO, LT John M. Currie, Class 109, will enter a dermatology residency at Oklahoma University in July. LT Mark Rhodes and LT Louis Fischer of the April '67 Flight Surgeons' Class will be arriving soon as reliefs.

The administrative work load is soon to be lessened, hopefully, with the addition of an MSC Officer, thereby freeing the flight surgeons to work at what they do best and enjoy most, namely seeing patients and functioning as flight surgeons.

The hunting, fishing, and scenery are outstanding. Stop by for a visit on your next cross country.

--LT J. M. Currie

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NAS Lakehurst, N. J.: The Aviation Medicine Department at NAS Lakehurst presently is composed of LCDR Curtis G. Graham (Class 105) and LT George A. Williams (Class 111) as well as myself.

Curt is on his second tour as a flight surgeon now. His first tour was at Santa Ana, Calif., with the Marines (3rd MAW), which included a tour in Vietnam with the 1st MAW. While in Vietnam, Curt was given a Bronze Star with Combat "V", four Air Medals, Navy Unit Commendation Ribbon and an Armed Forces Expeditionary Medal. In June 1967, he will be released from active duty and will begin an Ob-Gyn residency at Hahnemann in Philadelphia. He plans to go back to California to practice after that. Curt has been a real dynamo by "attaching" himself to NARTU and tending to the needs of the weekend warriors. This is no small job as we have a very active reserve unit. In addition, he and LT George Williams have a Gyn Clinic one day a week.

LT George Williams is now the proud papa of twins - a boy and a girl, born 13 Dec 1966. George is attached to HC2 and HC4 as flight surgeon and is doing a bang-up job with the squadrons. He and Curt handle aviation medicine and help out with the dependents when time permits. George's plans are to take residency Ob-Gyn training.

--CAPT Paul E. Black

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U. S. Naval Academy: I am the only flight surgeon assigned to the U. S. Naval Academy. This billet is solely one of general medical officer duties with aviation physicals. The majority of the aviation physicals, naturally, are student naval aviation qualification exams on the graduating midshipmen desiring pilot training. This function is only really necessary for about two months out of the fiscal year. There is very little contact with actual aviators and very little function as a flight surgeon otherwise.

One note that might be interesting to the readers of the "Newsletter" concerns CAPT John T. Smith, MC, USN (Retired-Active). CAPT Smith, known to many as

"Captain Jack," is the senior flight surgeon presently serving in the Medical Corps. He served 18 years as a flight surgeon before retiring, from which he was recalled to active duty to become the Chief of the EENT Service at the Naval Hospital, Annapolis. "Captain Jack" is well known to many senior flight surgeons for the ENT training they received from him at Pensacola. He also has been responsible for establishing the physical criteria for for naval aviation training. His long experience with aviation medicine has certainly been an asset regarding problems arising with physical qualifications of midshipmen desiring aviation training.

---LT R. M. Hughes  
MC, USN

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NAS Olathe, Kansas: Here at the NAS Olathe Dispensary we are having a clean sweep; within the next few months all of our officers will be replaced. Specifically, CAPT Karl R. Whitney, MC, USN and LCDR Noma V. Foster, NC, USNR are retiring; LT Michael J. McKenna and LT David A. Smith are going to inactive duty, and CMSW-3 William V. Merrick is being transferred to CNARESTRA.

So far, we have orders on LCDR Larry R. Fout, MC, USN who will be senior medical officer, LT Jerry C. Freeman, MC, USNR who will relieve LT McKenna, LCDR Fred E. Liedtke, MSC, USN will relieve Mr. Merrick and LCDR Mabel A. Olson, NC, USNR is replacing LCDR Foster.

Our mission remains essentially the same. During the past one-half year we trained some Argentine Air Force pilots and found them to be - if you'll excuse the term - very good shipmates. Our reserve pilots are flying the A-4, C-118, P-2V and C-45; F-8 and T-2V (Marines) and are hot on the trail of both safety and readiness trophies.

News from NAS Olathe would not be complete without a note of appreciation for the support given us by the civilian community. A typical example is the dedicated service rendered by our Selected Reserve doctors without whom the Dispensary would be hard put to complete its mission. Several of these doctors have perfect attendance record on drills and ActDuTra since affiliation. Without exception they are tigers. Their names: CDR Harold M. Voth, CDR Robert B. Stein, CDR Donald A. Senhauser, CDR William W. Van Stone, LCDR James M. Flynn, LCDR Ketchel H. Huber and LCDR Gary L. Robinson.

-- CAPT Karl R. Whitney, MC, USN

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NAS Lemoore, Calif: The Naval Air Station, Lemoore, was commissioned in July 1961 and is in the southwest part of the San Joaquin Valley. This puts it about 35 miles from Fresno which, in turn, is about 1 1/2 hours from the ski slopes of the Sierras, 1 1/2 hours from the Pacific Ocean, and four hours to either Los Angeles or San Francisco.

NAS Lemoore is the newest master jet station and has about 31 tenant commands, which includes 23 deployable attack squadrons, three RAG squadrons, and at least five air wing commands. To medically support these commands, representing some 8,000 troops with a dependent following of around 14,000, there are 12 flight surgeons assigned to the Fleet units, three to the Naval Air Station, plus eight other medical officers on the hospital staff. As would be understood, the Fleet flight surgeons are in and out on deployments but there is an average of five on board at any given time. These flight surgeons man the dispensary in the hangar area and spend one day a week in the hospital clinics and have about one duty a week in the hospital, either as OB Watch Officer or Medical Officer of the Day.

The Station Hospital was designed as a 65-bed unit and its inpatient census averages 30 per day. One index of activity is the fact we average 50 deliveries a month. Again as expected, most of the work is on an outpatient basis but there is enough pathology to keep the troops happy. The NAS staff includes:

CAPT Oscar Gray, Jr., Senior Medical Officer/Flt Surgeon

LCDR F. F. McBride, Ob/Gyn

LT Eric Sailer, Ob/Gyn

LT I. L. Gee, Pediatrician

LT Richard Hicks, Surgeon

LT Dave Keefer, X-Ray

LT Dave Stubbs, Internal Medicine

LT Joel Sherlock and

LT Mel Bechtel, General Medical Officers

LT Byron Riegel and

LT Bob Goldberg, Flight Surgeons

Dr. Riegel serves as standby anesthetist and has been most helpful on our Drug Committee because of his interest in and knowledge of pharmacology. Bob Goldberg also works in the Outpatient Clinic primarily but has an adopted squadron that he spends time with and is presently deployed for weapons training with that squadron to NAAS Fallon, Nevada. In the Operations Area, seven miles from the hospital, the flight surgeons work with their squadrons and man the Operations Dispensary. LCDR Ernie Johnson is with VA-125, which he says is the largest squadron existing. It is a RAG squadron and they really have plenty of troops, pilots and aviation medicine needs. Ernie will complete his active duty tour with the Navy in July and has a surgical residency in the VA Hospital in Memphis starting then. His relief has passed through here on a well-earned leave. He is LT David B. Gillis, who just finished a year on Marble Mountain with the First Marine Air Wing in Vietnam and he has some real positive and good ideas on how aviation medicine can help the system.

LT Dick Rubottom made a couple of WestPac cruises before being assigned to VA-127, another RAG squadron for jet instrument training. Dick also leaves the service in July and has already built his clinic and bought a house in Coalinga, 25 miles down the road. The third RAG flight surgeon is Bill Towne, who is with VA-122. He is in the middle of a big growing phase for his squadron is taking over the RAG duties for the A-7A bird. He takes his share of duty to Fallon, to Yuma, Arizona, and carrier quals.

LT R. W. Smith recently returned from a WestPac deployment and wears an Air Medal. Bob will start a radiology residency at Naval Hospital, Oakland, come July. On board at this time we have LT Dick Fahrenbruch with CVW-16 and scheduled to deploy to WestPac pronto. Dick just finished three weeks at Naval Hospital Oakland in anesthesiology so he will be a big help to the ship during its time out. LT Taylor I. Cook with CVW-2 just got off his first WestPac cruise and also wears an Air Medal. Taylor will resume his headquarters down at Miramar when he is relieved because he came up here to fill a vacancy created by LT G. Brown Sibert. Dr. Sibert had a malignancy discovered and had to leave active duty last year. I am sorry to hear that at this time he is worse and has about ceased all duty.

Out on deployment from here is LT William G. Akins, Jr., his second tour out on ENTERPRISE. Bill will enter an orthopedic residency at the completion of his active duty. Also in WestPac for his second time is LT Phil Winskunas, aboard BON HOMME RICHARD. LT Patrick J. Sweeney is out on TICONDEROGA for his first WestPac cruise and combat assignment, as is LT Edwin Protas, on HANCOCK. LT John Murphy on KITTYHAWK went right back out after a short turnaround and LT John Howe is on CONSTELLATION with his air wing.

The senior medical officer at Point Mugu, CAPT Jim Niforopulos, relieves me. I will relieve CAPT Jerry Zarriello in DaNang in July and CAPT Zarriello will go to Mugu to complete the musical chairs in our small circle.

--CAPT Oscar Gray, Jr., MC, USN

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NAS Mayport, Fla.: The Naval Station dispensary at Mayport, Fla. has a quota of six medical officers. CAPT L. E. Anthony heads the medical department with assistant medical officers LT Harry Sauers, LT Al Shalita, LT Naz Abraham, and LT Ray Iglecia-Fernandez. The flight surgeon, LT Don Gallup, recently reported aboard after a two-year tour with VP-8, Patuxent River, Md. LT Gallup's recent deployment to WestPac with VP-8 was an eye-opener in all respects. There are only four active aviators at Mayport, whose primary flights are for SAR duty.

CDR Fred Ottie, our optometrist, handles the refractions for all ships' personnel and dependents. The ships' doctors, LT Paul Horn, LT Jim McGonigle, LT Ron Flam, and LT Bob Fincher, assist the station physicians at the extremely busy dispensary when they are not deployed. LT Kent Bartruff and LT Julius Garner are now deployed with their respective ships to Southeast Asia.

LT Roger Stockman, our MSC officer, handles the paper work for us.

Golf, fishing, or the nearby surf are enjoyed by most of us when we don't have the dirty duty. Within the next year, the dispensary will have a complete changeover with LT's Sauers, Shalita, Abraham, and Gallup going to their chosen civilian residencies. LT Iglecia is bound for the School of Aviation Medicine, Pensacola in January, 1968.

--LT Donald G. Gallup, MC, USN

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NAS Twin Cities: NAS Twin Cities adjoins Minneapolis-St. Paul International Airport in southern Minneapolis. Airport runways are jointly used by the Navy, Army, Air Force, National Guard, and civilian private and commercial aircraft.

The station has 42 aircraft, including P-2V's, A-4D's, Beechcrafts, C-54's, T-33's, T-34's and Marine R-4Q's. Getting flight time is no problem for the two flight surgeons aboard. Various Reserve units are frequently being airlifted to stations throughout the U. S. for two weeks' active duty training. In spite of one of the most severe winters seen in this area in years, air operations continued as usual, thanks to the diligent and tireless efforts of station personnel supporting the Reserve Program.

Most of our working day here in the dispensary is taken up with physical exams of all types and the care of dependents in the area. This is a Tri-Service Dispensary, responsible for Air Force and Army personnel and their dependents, as well as Navy. Hospital backup is given by the Minneapolis Veterans Administration Hospital for active duty personnel only. Dependent consultations and/or hospitalization are done in private facilities under Medicare or by Airevac to service hospitals throughout the nation.

The S.M.O. is CDR F. D. Beckwith, MC, USN, who leaves for duty at NAF Andrews in June 1967. His relief is CAPT E. E. Hedblom, MC, USN, who is coming from NAS Whidbey. CAPT Hedblom has a keen interest in cold weather operations and will surely find duty at NAS Twin Cities challenging.

LT Bill McNally, MC, USN, honchos the aviation examining room. He has done an outstanding job in spite of the volume of physicals and a multitude of various standards that have to be met by personnel from all branches of the service and various government agencies that come here for exams. Bill is planning a pathology residency at Mayo Clinic at the end of his service obligation. Assisting Bill is LT Bob Schumacher, MC, USN. Bob enters a radiology residency at the University of Minnesota in July 1967.

The Dependents' Clinic is quite active. LT Larry Leider, MC, USN, supervises this area. Larry came here from Vietnam and departs for an Ortho residency in July 67 at the University of Minnesota. Larry is assisted by LT Harold Lubin, MC, USN, scheduled to leave for Vietnam in April '67, LT Gary DeMuth, MC, USNR, and LT Dave Ritzenthaler, MC, USNR, make up the rest of the medical team. Both are returning to civilian life in July, 1967.

LCDR M. Johnson, NC, USN, retired in July, 1967 after 20 years of naval service. She is assisted by two Civil Service nurses. CWO Norm Paulsen, MSC, USN, does a fine job as medical administrative officer.

Recreational facilities of all sorts are abundantly available in the area and include water sports, winter sports, hunting and fishing. There is major league baseball, professional football, college, and this fall a major league hockey team will make its debut in the City of Lakes and the land of sky blue waters.

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# Flight Surgeon's NEWSLETTER

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## FLIGHT DECK HEAD INJURIES AND PROTECTIVE HEADGEAR

It is a well known fact that head injuries occur often to flight and hangar deck hands. Their long and irregular working hours and the numerous obstacles, high noise level, and tempo of air operations aboard aircraft carriers all add up to an environment conducive to frequent injuries.

During 1964 and 1965 listings of injuries were forwarded to the Naval Aviation Safety Center from all CVA's, CVS's and LPH's. These reports included injuries which occurred on the flight deck, hangar deck and "all other spaces." For the purpose of this discussion, flight deck and hangar deck injuries, which occurred on 18 randomly selected CVA's and CVS's of both the Atlantic and Pacific fleets were analyzed comparing the number of head injuries to the total number of injuries. A head injury was defined as any laceration, contusion, concussion or fracture occurring from the eyebrow up. Propellor injuries were not included.

A total of 2578 flight and hangar deck injuries occurred on these 18 ships in 1964, 502 or 19.5% of which comprised head injuries as defined above. This breaks down to 1260 flight deck injuries of which 226 or 18% involved the head and 1318 hangar deck injuries, 276 or 21% involving the head.

During 1965, 1256 injuries occurred on the flight deck, 280 or 22.3% involving the head. Hangar deck mishaps numbered 1139 including 290 (25.5%) head injuries. Totaling the above figures, in 1965 there were 2395 flight and hangar deck injuries, 570 of which were head injuries for an overall percentage of 23.8.

Summarizing the above figures for this 24-month period, 4973 injuries occurred on both the flight and hangar decks of which 1072 were injuries involving the head. This means that in the sample studied, 21.6% of all flight deck and hangar deck accidents during the two-year period reported involved injuries to the head.

A further breakdown of the above figures reveals that during 1964, 57.5% (130 of 226) of flight deck head injuries and 56.6% (156 of 276) of hangar deck head injuries were scalp lacerations. Thus scalp lacerations accounted for 286 or 57% of the 502 head injuries. Again, looking at the figures for 1965, it is observed that 63.6% (178 of 280) of flight deck injuries and 59% (171 of 290) of hangar deck head injuries were scalp lacerations. Therefore of the 570 head injuries occurring on both the flight and hangar decks of the 18 carriers during this period, 349 were scalp lacerations accounting for 61.3% of the total.

The above figures and percentages substantially bear out the fact that flight and hangar decks of CVA's and CVS's are truly hazardous places in which to work. However, the number of head injuries in these working spaces can be reduced appreciably if protective headgear is worn. At present a program is underway under the direction of Naval Air Systems Command to obtain a protective helmet that will be acceptable to flight deck personnel.

The proposed helmet is the Model HPG-9A as illustrated in the accompanying photographs. The HPG-9A offers head protection with the added feature of sound attenuation. It is constructed in essentially three component sections: cloth helmet, plastic hard shell and protector pads. The cloth helmet is in four sizes and of khaki. An ABS plastic is utilized to make the hard shell. The shell is in two pieces, comes in seven colors and can be easily removed. The protector pads are made of a closed cell foam material which is quite soft, but is very slow to deform. "Mickey Mouse" ears, which are detachable from the helmet, are used for sound attenuation.

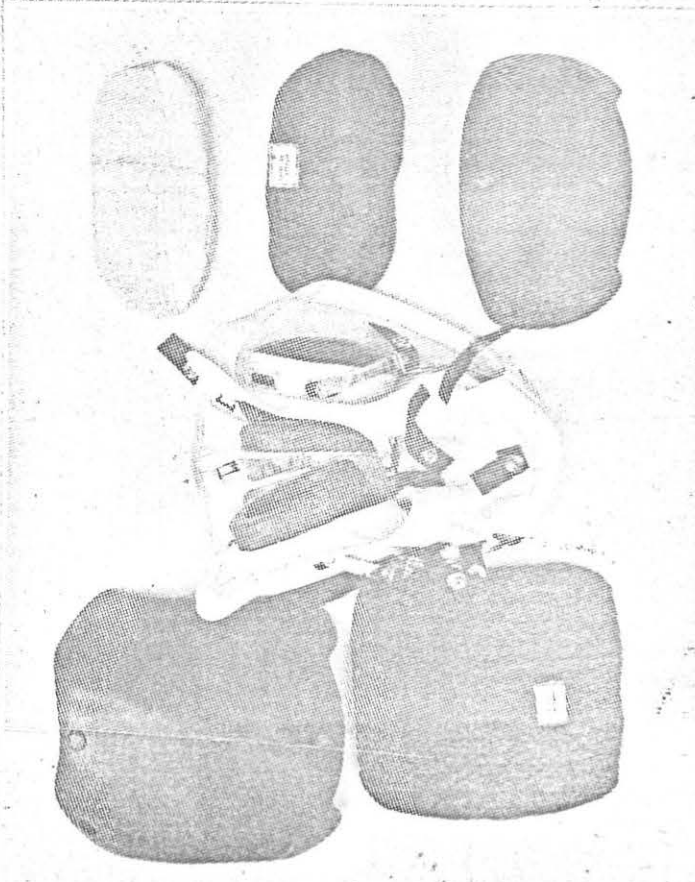
Three hundred of these helmets have been evaluated in the fleet with acceptance by flight deck crews and with their recommendation that the helmet be put in the supply system as a stock item. A Federal Stock Number has not yet been assigned; however, the HPG-9A hopefully will be standard issue for flight deck personnel within six months to a year.

It is felt that when this headgear is in the fleet and is worn by flight deck personnel, head injury statistics such as those above will be appreciably lessened.

Summary: Flight deck and hangar deck injuries occurring on 18 CVA's and CVS's of both the Atlantic and Pacific fleets during a two-year period have been summarized. Twenty-two percent of all injuries involved the head and 60% of these were scalp lacerations. These injuries could be greatly diminished if a lightweight metal or plastic helmet such as the recently evaluated HPG-9A were utilized by all flight and hangar deck hands.

--LCDR George M. Stone, MC

MODEL HPG-9A HELMET





PICTURES AT ACCIDENT SCENE

In a recent accident, the body was removed before photographs were made. As a result, investigators were unable to evaluate the operation of survival equipment. In the interest of complete accident investigation, flight surgeons should, when feasible, obtain pictures prior to the removal of or the moving of the body.

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FLIGHT SURGEONS APPOINTED DEPUTY EX OFFICIO CORONERS

LCDR Charles E. Johnston of NAAS Fallon sends in the following information concerning appointment of NAAS Fallon flight surgeons as deputy ex officio coroners: "This arrangement with local officials gives us authority to remove deceased from sites of accidents after declaring them dead. Prior to this, we used to have to wait many hours at the scene for the local officials to come and give us permission to remove the remains. This solution benefits both the command and the local officials. Good public relations with the local townspeople helped. Maybe someone else is having this trouble and would be interested in our solution."

TO THE HON. BOARD OF COUNTY COMMISSIONERS OF CHURCHILL COUNTY.

As approved by you on request through the District Attorney's office, I hereby appoint LT. COMMANDER DR. CHARLES E. JOHNSTON, SR. MEDICAL OFFICER as Deputy Ex Officio Coroner of Churchill County. His duties shall be confined to the government installation including its bombing ranges in Churchill County and will be instructed by this office of his duties pertaining to his appointment. It is understood that this appointment has no compensation connected there-with, and is for the purpose of expediency and assisting both the Navy and this office.

Thank you for considering this appointment.

Sincerely,

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Justice of the Peace  
New River Township  
County of Churchill  
State of Nevada

cc. Lt. Commander Dr. Charles E. Johnston  
District Attorney

LET'S KEEP IN CONTACT

MAG 26, 2nd MAW, FMF Atlantic, MCAF, New River: Spring saw the arrival of two flight surgeons from Class 114; LT Bob Jones replaced LCDR Randy Harrington as medical officer for Marine Corps Air Facility. Randy has departed for Bethesda and a residency in ENT. LT Carl Fischer bolstered the ranks of MAG-26 and upon arrival was assigned to helicopter squadron HMM-161 and HMM-261. The return of LT John Calcagni (Class 111) from a recent Caribbean deployment with HMM-162 was a most welcome sight; John hopes to do post-graduate work at the University of Rochester next summer. With the departure of LCDR Harrington, LT Eugene Wolski (Class 107) assumed the role of senior medical officer for MAG-26 and MCAF, New River. Gene plans to leave in January for private practice in Texas. LT Ed Sparks (Class 112) rounds out our family of flight surgeons; Ed was deployed last fall with HMM-365 in the Caribbean operation area.

--LT E. J. Wolski, MC, USN  
MAG-26

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# Flight Surgeon's NEWSLETTER

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## OPNAV INSTRUCTION 3750.6F NOW EFFECTIVE

Existing instructions clearly define the duties and responsibilities of the medical officer in an aircraft accident investigation but these instructions are not followed in all cases. This has been pointed out a number of times in previous issues of the Flight Surgeon's Newsletter. A revised instruction, OPNAV 3750.6F, became effective on 1 July 1967. It is recommended that this instruction and the appropriate BUMED INST 6510 series be reviewed. Enclosure (1) is included to provide a quick reference source.

## EYE INJURIES ON AIRCRAFT CARRIERS

While gathering data on head injuries which occurred on aircraft carriers, a rather significant number of eye injuries was also noted. A deeper survey of the data continued to confirm this observation which has led to the following discussion.

Eye injuries, no matter where they occur or what their severity may be, are uniformly painful and disabling to varying degrees. What is more important, however, is that most are avoidable.

During 1964 and 1965, listings of injuries were forwarded to the Naval Aviation Safety Center from all CVA's, CVS's and LPH's. These reports included injuries which occurred on the flight deck, hangar deck and "all other spaces." For the purpose of this discussion, flight deck and hangar deck injuries, which

occurred on 18 randomly selected CVA's and CVS's of both the Atlantic and Pacific fleets, were analyzed comparing the number of eye injuries to the total number of injuries. Eye injuries were broken down into four categories, i.e: 1) those caused by foreign bodies<sup>1</sup>, 2) those caused by various liquids splashing in the eyes<sup>2</sup>, 3) corneal abrasions and/or lacerations and 4) burns caused by looking steadily at welding arcs.

A total of 2,578 flight and hangar deck injuries occurred on these 18 ships in 1964, 354 or 13.75 percent of which comprised eye injuries. This breaks down to 1260 flight deck injuries of which 182 or 14.4% involved the eye and 1318 hangar deck injuries, 172 or 13 percent of which were to the eye. A further breakdown of these figures reveals that 150 or 42.5 percent of the total eye injuries were foreign bodies. Seventy-eight of these injuries occurred on the flight deck and 72 on the hangar deck. Thirty-eight point four percent or 135 of the 354 injuries were caused by various liquids splashing into eyes. This included 56 injuries occurring on the flight deck and 79 on the hangar deck. There were 60 cases of conjunctival burns caused by looking at welding arcs accounting for 17.9 percent of the total eye injuries. Forty-seven of these occurred on the flight deck and 13 on the hangar deck. Approximately 3 percent of the remaining injuries were corneal abrasions/lacerations, eight of which occurred on the hangar deck, and one on the flight deck.

Turning now to the figures for 1965, a total of 2395 flight and hangar deck injuries occurred on these 18 ships; 218 or 9.01 percent were eye injuries. These figures break down to 1256 flight deck injuries, 133 or 10.6 percent of which were eye injuries and 1139 hangar deck injuries, 85 or 7.5 percent involving the eye. Further study of these figures reveals that 60 or 27.5 percent of the total eye injuries were foreign bodies as described above. Forty-one of these injuries occurred on the flight deck and 19 on the hangar deck. Ninety-nine or 45.4 percent of the total eye injuries involved various liquids splashing into the eye. Forty-six of these occurred on the flight deck and 53 on the hangar deck. There were 49 cases of conjunctival burns caused by looking (gazing) at welding arcs accounting for 22.5 percent of the total eye injuries. Forty-four of these injuries occurred on the flight deck and five on the hangar deck. The remaining 4.6 percent eye injuries consisted of corneal lacerations/abrasions for a total of 10 injuries, eight of which occurred on the hangar deck.

Now, summing the figures for the 24 month period under question, there were a total of 4973 injuries which occurred on both the flight and hangar decks; 572 or 11.5 percent involved the eye. Of the 2516 flight deck injuries reported during this period 315, or 12.5 percent were to the eye. There were also 2457 hangar deck injuries reported, 257 or 10.5 percent of which involved the eye.

The above statistics show that eye injuries are a rather frequent occurrence on flight and hangar decks of aircraft carriers. It would not be surprising if

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<sup>1</sup> Dust, dirt, paint chips, metal, etc.

<sup>2</sup> Liquids included fuel, non-skid paint and paint thinners, detergents, cleaning fluids, cleaning solvents, and battery acid.

these figures were now somewhat higher because of the increased air operations in Southeast Asia. True, a small percentage of the injuries cited were what we would call severe; however, all these "minor" injuries were painful, somewhat disabling and mostly avoidable. Avoidable is the key word, for if protective gear were utilized many of these injuries would not have happened. The current CVA/CSV NATOP Manual of 1 Dec 1966 in paragraph 210 states "..... all personnel whose duties require them to work on the flight deck shall wear goggles, sound attenuators, and flight deck shoes." It is recommended that flight surgeons continue to emphasize the importance of protective goggles to all hands and also to encourage them to wear them when working on the hangar deck. It is further recommended that medical personnel continue to caution all hands about the hazards of gazing at welding arcs.

--- LCDR G. M. Stone, MC

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#### MYOCARDIAL INFARCTION IN FLIGHT

A 40-year-old aviator was the rear seat pilot on a basic instrument familiarization flight in a TF-9J, the first hop of the routine instrument course. Approximately half-way through the hop, 45 minutes after take-off, just after shooting a penetration, the subject noted an oppressive retrosternal pain with associated diaphoresis and feeling of weakness. This was followed by numbness in the left arm and an aching sensation in both wrists. He informed the instructor pilot that he had "heartburn." The instructor pilot had him stop his instrument flying and take a short rest. After several minutes, the diaphoresis and wrist pain subsided and he completed the flight without difficulty.

The flight, conducted at FL 230 and below, was a routine, basic instrument fam hop which involved recovery from unusual attitudes, instrument penetrations, GCA's, etc. It did not involve any high positive or negative G forces and no particularly difficult or intricate maneuvers. The subject states that he had his O<sub>2</sub> mask on and set at normal. This should have kept his alveolar pO<sub>2</sub> at or near the normal (approximately) 100 mm Hg. of sea level, the investigating flight surgeon states.

The subject denies any sensation of shortness of breath, dyspnea, faintness or dizziness. At no time did he feel incapable of adequately controlling the aircraft or concerned about his ability to do so.

On exiting the aircraft, the subject told the instructor he had pains all through the center part of his chest and that his left wrist was numb. He was directed to report to sick bay. He then walked to the hangar and up a double flight of stairs, wearing his 20+ pounds of flight gear. He had a cigarette and a cup of coffee while he debriefed and then, because the pain persisted, reported to the dispensary, approximately 1 1/2 hours after the onset of symptoms.

Physical examination at the dispensary was normal but the EKG revealed ST and T wave changes and the subject was sent to a naval hospital via ambulance. Laboratory tests and serial EKG's confirmed the presence of an anterior/antero-

septal infarct. His recovery has been essentially uneventful to date except for persistent S-T elevation in the V leads and the occurrence of "chest wall syndrome" symptoms.

The investigating flight surgeon states that there are at least three significant factors worthy of note in this incident:

1. Just one week prior to the incident, the subject had an episode of chest pain while briefing for this same hop. The pain was similar to that which he suffered in the incident described above and was severe enough to make him cancel the flight. It was not immediately relieved by ASA and bed rest, but finally subsided after 1 1/2 to 2 hours.
2. The subject had an appointment for his annual flight physical in the week between the earlier episode and the M.I. described above but he postponed it due to the press of other commitments in his work.
3. Despite severe and rather classic symptoms, the subject did not abort the flight even when it was suggested by his instructor pilot. He only presented himself for medical evaluation after his symptoms had persisted for at least 1 1/2 hours.

These factors are listed for classification, the flight surgeon states, and are in no way intended to criticize or condemn the individual(s) involved. It is highly unlikely, he says, that there was any conscious intention to avoid medical care or hide the facts; rather "the mental mechanisms of suppression and denial so common to aviation were no doubt at work." Unfortunately, he points out, a different course of action in any or all of the above factors might well have altered the subsequent chain of events.

Investigating flight surgeon's recommendations: That aviators be constantly exhorted to:

1. Report promptly to their medical officer/flight surgeon any severe symptoms and especially any that require cancellation of a scheduled flight.
2. Schedule and undergo a punctual annual flight physical. This examination is potentially more important than most of the "pressing business" back at the squadron.
3. Cancel or abort a flight promptly whenever any symptoms occur which involve a feeling of weakness or any other persistent sensation which may progress to incapacitation.

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#### READER COMMENTS

The following letter was received from LCDR B. H. Hirsch, MC, Naval Air Facility, El Centro:

"The account entitled 'Medical Officer Experiences Decompression Sickness in

T-33B' in Flight Surgeon's Newsletter 6-67 calls to mind an attitude that I have previously expressed. Cockpit type aircraft are designed to carry persons knowledgeable and appreciative of aviation in general and not to have one passenger place in the rear seat. The Navy has sufficient availability of cabin type aircraft for this purpose. This, of course, is still just my opinion, loosely held, but I would like it kicked around by the Naval Aviation Safety Center.

. We concur with your views that only persons knowledgeable and appreciative of aviation in general be carried as passengers in cockpit type aircraft. OPNAV Instr. 3740.3B requires that before flight in high performance aircraft, passengers should have training in the ejection seat and low pressure chamber.

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#### LET'S KEEP IN CONTACT

USS ORISKANY (CVA-34): At the time of this writing, the "Mighty O" is once again steaming westward ready to do battle. Since her tragic fire in October 1966 resulting in the loss of 44 personnel, including an Air Group flight surgeon and the senior medical officer, the ship has undergone extensive repairs and outfitting. The Medical Department is now up to "fighting snuff" with much new equipment and we are ready to do our part.

The new Air Group flight surgeons are Dr. Dick Fahrenbruch, dubbed the "Attack" Quack" from Lemoore and Dr. Blair Edwards, named the only "Two Star" lieutenant by his fighting squadrons based at Miramar. These two fine young Docs are both bachelors - and you know what that means!

The ship also sails with a new SMO, LCDR Al Adeeb who reported from RCVW-4 as a naval aviator-flight surgeon. Mention must also be made of our new MSC officer, LTJG Leonard Julius, and our only "Old Salt" aboard, LCDR Will Williams, the surgeon who was on the ship during the fire. Dr. Williams is more of an airdale than a blackshoe so we feel we have a team that "clicks." Bon Voyage til next time.

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LET'S KEEP IN CONTACT (Continued)

NAS MEMPHIS: NAS Memphis is a surprisingly large station (larger than most people think) with 15,000 to 20,000 men aboard. We are the headquarters for Naval Air Technical Training Command (NATTC) with the CNATTC here. Too, the largest component of all the technical schools is here, hence the great number of personnel. The two other primary commands are NAS and NARTU (and MARTD). There's a surprising amount of flying here and getting our time in is no problem -- a myriad of C-117's, C-54's, "Bug Smashers," T-28's, and a C-121 Super Constellation. The reservists fly a squadron of A-4's and P-2's.

Memphis is a fine, quiet, clean, progressive southern city of 500,000 and I have found few who have been here who don't like it. Not so for the climate though - hot in summer and cold in winter. I would recommend a tour of duty at NAS Memphis to anyone.

Our dispensary is the responsibility of CAPT J. O. M. Thatcher, the senior medical officer. CAPT Thatcher is not sure of his rotation date but feels as if he will be here several more months anyhow. I'm sure I speak for all my contemporaries when I say that it would be difficult indeed to find a better CO to work for than CAPT Thatcher.

We all hated to see LCDR Fred Spencer leave in January after he had become so well-entrenched in the area. However, word has it that he's doing quite well in private practice in Salem, W. Va. All three of the remaining contingent of flight surgeons are departing also: LCDR Ray Hayworth begins a civilian psychiatry residency at the University of Tennessee; LT Larry Raulston begins an ophthalmology residency in New Orleans; and this writer, LCDR Jerry Jernigan, begins an ophthalmology residency at the University of Cincinnati. The turnover will be complete. Already LT Bill Claybaugh (just out of NAVSCAVMD) and LT Tom Alston (just about from the West Coast) are aboard. Another flight surgeon will report aboard in the near future.

I feel sure I speak well for the boys in Memphis when I say that anyone is welcome for a visit at NAS Memphis at any time.

--J. M. Jernigan

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AEROSPACE MEDICINE RESIDENTS VISIT SAFETY CENTER

A group of 12 residents in aerospace medicine from the Aerospace Medical Institute, Pensacola has just completed a three-day seminar at the Aviation Safety Center's Aero-Medical Department. They are CAPT Samuel A. Youngman, MC, USN; CDR William R. Winter, MC, USN, CDR Paul C. Gregg, MC, USN; CDR Theodore J. Trumble,

MC, USN; CDR "J" Jerome Rinaldi, MC, USN; LCDR Donald R. Hauler, MC, USN; LCDR George W. Mathews, MC, USN; LCDR William W. Simmons, MC, USN; LCDR Clyde G. Jeffrey, MC, USN; LCDR Robert D. Wasson, MC, USN; MAJ Dudley R. Price, MC, USA, and CAPT Burton H. Kaplan, MC, USA.

On a tour of the Safety Center conducted by LCDR George M. Stone, the group was briefed by CAPT R. E. Luehrs, head of the Aero-Medical Department, and the staffs of the Accident Investigation Department and the Aviation Operations Analysis Department.

A more detailed presentation of the work of the Aero-Medical Department included discussion of the Medical Officer's Report and projects in the Biomedical Sciences Division by Dr. Stone and LT C. C. Cole, aviation physiologist; briefing by CDR Walter Gable, aviation pathologist, head of the Aviation Pathology Division; briefing by LCDR F. J. Hill, head of the Biophysical and Survival Division; and briefing by Dr. Robert Alkov and Dr. Joseph Sgro, psychologists, on the work of the Behavioral Sciences Division.

Other topics covered in the seminar were the aeromedical problems in the SST, a training method for midair collision avoidance; underwater escape devices, the invasion of privacy issue in psychological testing of government employees; disorientation training in aircraft and plans to perform cockpit fatigue studies similar to the 1940-56 Cambridge Cockpit Studies.

Also attending the seminar was LT Aldo Juan Drasich, a flight surgeon from the Argentine Navy, who is spending a month in the Aero-Medical Department. Dr. Drasich recently completed the flight surgeon's six-month course at the School of Aviation Medicine.

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INFORMATION FOR FLIGHT SURGEONS INVOLVED IN AIRCRAFT ACCIDENT INVESTIGATION1. Frozen Tissue

Frozen techniques are used for the preparation of sections for immediate diagnosis, certain histochemical procedures and materials requiring toxicological studies. Toxicological examinations are performed at the Armed Forces Institute of Pathology only in cases of aircraft accidents. Prompt collection of fresh tissue is essential in order to protect it against chemical or mechanical change. Chemical preservations invalidate results of toxicological analysis; therefore no fixing fluid (formalin) should ever be used, and formalin-fixed tissue should never be packed in the same container with frozen material. Refrigeration (dry ice) is the prescribed method of preservation, and rapid transportation is of the utmost importance.

2. Toxic Agents

In completing gross autopsy protocol (DD Form 1322), when toxicological studies are requested, it is important to indicate any suspected intoxicants or drugs. Every medical officer investigating an aircraft accident must be alert to the possible presence of toxic agents associated with aircraft as well as those not associated.

3. Preparation and Packing of Specimens

Tissue specimens for toxicological examination will be collected under the supervision of the pathologist performing the autopsy and will consist whenever possible of the following: Liver, brain, kidney, bone marrow, urine, and stomach contents. Precautions should be taken to prevent contamination of the specimen during the course of the autopsy. Thorough toxicological examination requires approximately 250 to 500 grams of brain, kidney, liver, and lung, 50 ml of blood, and all urine available. The amount of tissue available will govern the amount submitted. Red bone marrow and lung tissue are especially useful in such cases where disintegration of the soft tissue has occurred.

a. Individual tissue specimens, that is brain, liver, etc. should be placed in separate plastic bags. In view of the quantity of material required, it may be necessary to distribute the individual specimens between several latex rubber or plastic bags.

b. Blood and body fluids will be shipped in latex rubber bags. The air should be carefully evacuated prior to closing the bag by knotting or other means. As an added precaution, this type of bag should be enclosed in a second bag.

c. It is recommended that heavy polyethylene plastic bags (.005 or .006 gauge) or latex rubber bags (condoms) be used as individual specimen containers. The specimen should be placed in the plastic or rubber bag, as much air as possible evacuated from the bag, and the rubber bag then heat sealed, knotted, or securely fastened with a rubber band. As an added precaution, the tissue should be enclosed

in a second bag in which a tag with all identifying data should be placed. It is recommended that a paper label only be used in identifying frozen specimens, as plastic labels may cause camphor odors to penetrate the specimens and give false determinations. Heat-seal or fasten the second bag, as indicated above, and prepare for shipment. DD Forms 1322 (Aircraft Accident Autopsy Report), 1323 (Toxicological Examination - Request and Report), and any other available information should be sealed in a separate plastic bag and forwarded along with the specimen.

d. It is imperative that frozen specimens and dry ice not be packed in sealed cans or any type of container which will not permit the escaping gas to pass through its walls. Dry ice is formed under tremendous pressure; it requires approximately 230,000 cc of carbon dioxide under pressure to form one pound of dry ice. The pressure created inside a sealed container presents a potential hazard, as it could cause the container to burst. Do not enclose dry ice in a thermos bottle unless holes are drilled through the stopper of the thermos.

e. When packing for shipment, the specimen and protocols (DD Forms 1322 and 1323) should be placed in a stout cardboard box filled with pieces of dry ice and enough filler (sawdust, styrofoam, etc.) to fill and insulate the box. The box should be large enough to hold eight to 10 pounds of dry ice for a shipping time of 24-36 hours, and should be sealed with tape, then wrapped in several layers of heavy paper. A plastic insulated box is available on the Federal Supply Schedule; its nomenclature is "Box, Plastic, Insulated, Meat, Dairy Products, and Laboratory Samples."

#### 4. Addressing

The packing box containing specimens for toxicological examination should be labeled "FRAGILE - RUSH - SPECIMENS FOR TOXICOLOGICAL EXAMINATION (AIRCRAFT ACCIDENT)," and forwarded by military or commercial AIR FREIGHT to the Director, Armed Forces Institute of Pathology, Washington, D. C. Correct designation should be clearly written to insure prompt delivery. Send TNX notifying AFIP of (1) time of arrival, (2) airline, (3) flight number and airport. Also put telephone number (RA3-1000, ext. 2800) at AFIP on outside of package and ask carrier to call when material arrives. Mark "Frozen Tissue" on package, as well as the above "Fragile, etc."

NOTE: Dry ice should not be handled without the use of gloves and should not be placed in glass or other completely closed containers. Do not enter poorly ventilated areas where large quantities of dry ice are stored.

TIME TABLE FOR FROZEN SPECIMENS: A suggested table has been prepared for guidance of personnel in preparing fresh tissue specimens being shipped for use in toxicological studies. This table gives the estimates for outside temperature and number of hours in transit. This will assure that sufficient dry ice will be used to protect the specimen until its arrival at the final destination.

FOR OFFICIAL USE ONLY

<u>OUTSIDE TEMPERATURE</u>	<u>NO. HOURS IN TRANSIT</u>	<u>WEIGHT OF SPECIMEN</u>	<u>MINIMUM AMOUNT OF DRY ICE ADD MORE WHEN POSSIBLE</u>
Below 50 Degrees F.	72	2 lbs	5 lbs
	48	3 lbs	4 lbs
	24	4 lbs	3 lbs
50 - 80 Degrees F.	72	2 lbs	5 lbs
	48	3 lbs	4 lbs
	24	3 lbs	4 lbs
80 - 100 Degrees F.	72	1 lb	6 lbs
	48	2 lbs	5 lbs
	24	3 lbs	4 lbs
Over 100 Degrees F.	(Not recommended for shipments requiring over 24 hours)		
	48	1 lb	6 lbs
	24	2 lbs	5 lbs

5. Movement of Remains

Educate crash crew and other personnel not to move remains unless there is an absolute necessity for such action. Also do not proceed without permission from cognizant authority (i.e. medical examiner, coroner, or other designated official).

6. Photographs

Secure adequate photographic documentation.

7. Personal Equipment

Do not prematurely release or destroy personal equipment.

8. Phone Numbers

Do not hesitate to ask for assistance. Useful phone numbers are:

- a. NAVAVNSAFECEN - 444-3321 (after working hours, holidays, weekends - 444-3520)
- b. AFIP - RA3-1000, Ext. 2991

9. References

- Useful references:
- a. Autopsy Manual - NAVMED P-5065
  - b. BUMEDINST 6510 Series
  - c. OPNAVINST 3750.6F

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1. Introduction

The first part of the report discusses the background and objectives of the study. It outlines the scope of the research and the methods used to collect and analyze data. The objectives of the study are to identify the factors that influence the performance of the system and to develop strategies to improve its efficiency.

The second part of the report presents the results of the study. It includes a detailed analysis of the data collected and a discussion of the findings. The results show that there are several factors that significantly affect the performance of the system, and that these factors can be controlled to improve performance.

The third part of the report provides conclusions and recommendations. It summarizes the main findings of the study and offers suggestions for further research and for the implementation of the proposed strategies to improve the system's performance.

# Flight Surgeon's NEWSLETTER

(This material is for the information of Navy flight surgeons only and does not necessarily reflect endorsement by the Navy or the Naval Aviation Safety Center.)

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## "NEWSLETTER" DISTRIBUTION NOW INCLUDES CO'S

With this issue of the "Flight Surgeon's Newsletter," distribution is being increased to include squadron and air station commanding officers. (Distribution to date has been to flight surgeons, both active and reserve, physiology training units and medical departments of aircraft carriers only.)

A word of explanation to our new readers, the "Flight Surgeon's Newsletter" is a limited distribution publication in which various aspects of accident prevention can be discussed in more medical detail than would be possible or desirable in other Safety Center publications. As stated on the masthead above, the "Newsletter" is for the information of Navy flight surgeons only and does not necessarily reflect endorsement by the Navy or the Naval Aviation Safety Center.

Concerning the "Let's Keep in Contact" items, on a monthly schedule letters requesting material go out to the senior medical officers of air stations and aircraft carriers and to squadron flight surgeons. This averages out to one "Let's Keep in Contact" from each group annually. Items are printed in the order in which they are received.

We would like to take this opportunity to say once more that we welcome articles—either short or long—for consideration for use in the "Newsletter" and Approach, as well as suggestions of topics in aviation medicine and personal survival equipment which would be of interest in either publication.

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## TF-9J CREW EXPERIENCES HYPOXIA

The following report of hypoxia experienced by the pilot and pilot-passenger in a TF-9J points up the necessity for immediate descent to lower altitude whenever hypoxia is suspected. In this case they remained at altitude for approximately 15 minutes while symptomatic, checking their aircraft oxygen systems (finding them normal in all respects) and trying the bailout bottles.

The two pilots briefed for an early AM takeoff for a cross-country. Preflight was normal and both noted that the bailout bottles attached to their respective MB-A5A seats registered in the full range.

The flight proceeded at FL 350 as cleared and cabin altitude was maintained at FL 230 in accordance with the normal pressurization schedule of the aircraft. At about 1.0 hours the passenger-pilot in the rear seat flew the aircraft briefly. At this time his flying was a bit rough which he attributed to his recent absence from flying (just returned from Vietnam and leave) and his relative unfamiliarity with the TF-9J. He noted some tiredness and heaviness of his limbs but this did not alarm him.

The pilot took control back and kept it until about 1.5 hours when he had to make some computations involving the simultaneous use of a kneeboard, pencil and flashlight. While making the computations with his head down, he felt mildly nauseated and faint for the first time. The aircraft started a descent at 1000 fpm and at this point the rear seat pilot-passenger took control. The pilot then checked his LOX gauge, regulator, blinker, mask and connections; all was in order and he was on 100% oxygen. He cinched up his mask tightly and selected safety pressure on the regulator. He also consciously attempted to control his breathing for about 30 seconds. None of these actions improved his symptoms and he realized that he might well be hypoxic and/or suffering from contaminated oxygen although he noted no odors. He questioned the pilot-passenger as to how he was feeling and noted that he was not feeling well and was flying very poorly - not maintaining altitude within 1000' and allowing ascent and descent rates of 2000 to 3000' to develop on the vertical speed indicator.

While this was developing, the pilot-passenger had been flying the aircraft and was now definitely feeling abnormal. He later described his symptoms as nausea, mild faintness and noticeable mental and physical sluggishness. He noted a slow, idle scan, instrument fascination and slow responses to changes in aircraft altitude. It is noteworthy that his obvious incapacitation did not alarm him. He, in fact, had a feeling that all was in order and rationalized his ragged flying by lack of recent experience in this aircraft. He also experienced some difficulty holding his head up and keeping his eyes open.

At this point the pilot became alarmed, suspected that they both were being affected by some fault in the oxygen system and regained control of the aircraft from the pilot-passenger. He told the pilot-passenger to turn his oxygen regulator off and use the bailout bottle and did likewise.

The pilot noted a musty odor and full flow of oxygen which lasted an estimated 60 to 90 seconds. His symptoms of weakness and faintness improved on the oxygen. The expiration of the bailout bottle was abrupt, transition from free inspiration to apparent exhaustion of the bottle occurring over the course of one to two breaths. When this occurred, the pilot elected to descend to a lower altitude immediately. He removed his mask in order to breathe (he had already turned off the oxygen system because he suspected contamination). He told the pilot-passenger to keep talking over the intercom, pulled power to 80%, extended speed brakes and started down.

The pilot-passenger had experienced difficulty actuating the bailout bottle and had had to use both hands in order to pull the green apple hard enough. Once the bottle was actuated, oxygen flowed freely under noticeable pressure and with oxygen blowing out around the seal. His symptoms were improved but after 60 to 90 seconds, the bottle ran empty. He turned the aircraft oxygen back on in order to have something to breathe. During the subsequent descent, he experienced great difficulty holding his head up and keeping his eyes open, but he talked to the pilot as requested and stowed loose gear preparatory to canopy opening.

The aircraft was leveled at 7 or 8000' and slowed and the canopy was opened completely. There was a sudden blast of cold air and dust and both pilots felt symptomatically improved immediately. The pilot retained control and flew on for about 10 minutes until arrival at -- AFB where he contacted the tower and requested cancellation of his IFR plan. He was given a frequency change and was told to contact -- Center. However, he reasonably refused to do so and requested again that the tower cancel his instrument plan and clear him to land. The tower did so and he made a "roger pass" landing at about 0800. By the time they were interviewed by a flight surgeon, they both felt completely well and were not examined. No blood tests were done for hypoxia (lactic acid) or for carbon monoxide poisoning.

A LOX sample was taken for analysis and was found to be within technical requirements. A sample from the LOX cart from which the aircraft had been serviced that day showed no contamination and no contamination was found in the converter. Carbon monoxide tests on the ground, at 15,000' and at FL 350 were negative. Inspection of the regulators and connecting hoses failed to reveal defects.

The investigating flight surgeon thought the probable cause of the pilot's hypoxia was a defective laminar seal resulting in his breathing ambient air at a pressure of 23,000' along with oxygen from his mask. Over a period of 1.5 hours, this resulted in mild hypoxia, he theorized. The flight surgeon thought the pilot-passenger's trouble was due to his poorly fitting mask. He was wearing a medium size when he should wear small. He was most likely breathing ambient air at a pressure of 23,000' mixed with oxygen from the aircraft supply over 1 to 1.5 hours. The investigating flight surgeon thought toxic contamination of the aircraft oxygen supply was unlikely.

"The exact nature and cause of these pilots' symptoms must remain speculative," the flight surgeon concludes, "since no material proof is available. It is most probable that they were hypoxic and that the hypoxia was due to defective masks.

"It is apparent from reading the NATOPS Manual and the H-2 Bailout Bottle Manual that a possible source of confusion exists with respect to the proper use of the H-2 bottle. From these sources it can be concluded that the bottle will allow the pilot to remain at altitude if necessity arises. It will not, and apparently was never designed to do so. This has now been stressed to members of this squadron. Regardless of fuel state, location or other circumstances, if it becomes necessary to use the bailout bottle, an immediate descent must be made to

altitudes where it is safe to breathe ambient air. The bottle will not sustain an individual for 10 minutes at altitude. Both pilots in this mishap were under the impression that it would and probably most aviators in the fleet using this equipment are under a similar impression. This is incorrect and should be clearly stated in the NATOPS Manual which can and is presently interpreted to mean the bottle is good for 10 minutes at altitude."

(Use of the bailout bottle is part of the oxygen chamber run which pilots and aircrewmembers undergo every two years. Aviation physiologists in these chamber runs and flight surgeons in their squadrons should make sure that pilots and aircrewmembers know what to expect from the bailout bottle. -Ed.)

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#### LET'S KEEP IN CONTACT

Naval Air Station, Key West: From our antiquated facilities here in Key West, we eagerly await the arrival of our new senior medical officer, CDR L. H. Blackburn, Jr., who is presently sailing somewhere off Vietnam. Our former senior medical officer, CAPT R. W. Maher, departed the southernmost Naval Air Station on 30 June to assume the same duty at Cecil Field in Jacksonville. CDR Blackburn will have the task of opening our new dispensary due to begin construction in 1968.

NAS Key West, located seven miles northeast of Key West, has an allowance of 773 enlisted men and 61 officers. Besides NAS, we also furnish medical support for four Navy squadrons, two Air Force radar squadrons, one Air Force Fighter Wing Detachment and an Army Hawk Missile Battalion.

Besides the senior medical officer and myself, we have one general medical officer, newly-arrived John Milbrath. I relieved Tony Fargason (Class 108) as senior watch officer, NAS flight surgeon and acting senior medical officer. Tony departed for an ophthalmology residency at San Diego Naval Hospital in June.

The station boasts a number of units attached. The fastest moving is VF-101, the east coast F-4B RAG, with Bob Guthrie (Class 110) as flight surgeon. When he's not flying, Bob helps us with dependents. When December rolls around, he will depart for a radiology residency at the University of Iowa.

By contrast, the slowest moving group is HS-1, our SH-3A RAG, which along with VS-30, comprises CVSG-50, with Ken Scheidt (Class 114) attached to the Wing and Lou Lipsius (Class 110) attached to VS-30, the S-2 RAG. Frequent carqual cruises serve to break the routine for the CVSG-50 and VF-101 flight surgeons.

Jim Browning (Class 110) is attached to VX-1, a test and evaluation unit. Jim has become a world traveler during his tour and at times a bit difficult to locate. Once we found him in India with a downed aircraft (he says), and once in Pago Pago on his way to Australia.

Our frequently hectic days are interrupted by warm nights and warmer sunshiny weekends when we take to the water to fish, ski or dive, or travel to Miami. As occasional hurricane adds to the excitement, but this year, so far, so good.

The dispensary is backed up by the Naval Hospital, Key West, (we like to look at it the other way around), where consultations and inpatient care are available.

Our ever-present LTJG Ken OWENS, MSC, contributes mightily in keeping things on an even keel, constantly assuring us that when we finish this physical and fiscal there will be another to take its place.

LT T. L. Clark, MC

USNS Roosevelt Roads, Puerto Rico: The Aviation Medicine Division is organized as one of the four divisions of the medical department by a station hospital instruction. The division has an examining room which serves as the EENT department for the hospital, two private offices and a private physical examination waiting room. There are two flight surgeons, LT Don Fowler (Class 108) and LT Seth Anderson (Class 109), and two hospital corpsmen, HM1 Sabettini and HM3 Berry. The present senior medical officer, CAPT R. F. Schugmann, was a WWII flight surgeon.

Our function is to provide outpatient medical care for all flying personnel and to conduct all reportable physical examinations on active duty personnel. We also provide first stage consultation service for EENT and perform special testing for the hospital such as electrocardiograms, audiograms, caloric examinations, indirect laryngoscopy and eye examinations including slit lamp and visual field exams.

We perform all eye refractions on active duty and dependent personnel and order active duty spectacles. We also conduct and administer the Station Hearing Conservation and Weight Control Programs.

Despite the rather busy sounding schedule, we still find time to spend two afternoons per week at the squadrons or station areas; VP-18 (Seth), VC-8 (Don), and NavSta (both). We are responsible for all flying personnel from Venezuela to Eleuthera, so we have more than ample opportunities for boon-doggles.

Hospital privileges are unlimited. Seth assists the internist, LCDR Dave Wallin, while I back up the OBGYN, LCDR Norm Pare, and surgeons, LCDR Bob Roe and LT Marx Bowens. We both admit, care, and discharge all our own patients as well as spending one morning a week relieving LT John Jabbs in military sick call.

The area itself is fantastic - 70-80° in summer. Plenty of golf, horseback riding, sailing, snorkeling, etc. San Juan is only 40 miles away and provides all the high class entertainment one could desire.

If you're married and interested in a general practice type, non-deploying flight surgeon's billet, you can't go wrong at Roosevelt Roads, Puerto Rico.

--LT D. R. Fowler, MC

MEDICAL STUDENTS AT SAFETY CENTER

During the months of June, July and August four medical students in the Ensign 1915 Program have been assigned to the Naval Aviation Safety Center for two months of active duty. The designator 1915 refers to an officer of the Naval Reserve under instruction in an accredited medical school. The primary objectives of the Ensign 1915 Program are to provide (1) an opportunity for qualified medical students to affiliate with the Naval Reserve as commissioned officers while still in medical school, regardless of race, creed or national origin; (2) assurance that these officers will be able to complete their medical studies and internship prior to fulfilling their obligation for active military duty; (3) assurance that when they do enter service it will be with the Navy's Medical Department; and (4) a primary source of qualified candidates for the Naval Intern Program and for the Medical Corps of the Navy and Naval Reserve. (NavMed P-5075 gives full information on the 1915 Ensign Program.)

In the Safety Center group, the University of Maryland is represented by ENS Julian A. Gordon, USNR, and ENS Norman W. Taylor, USNR. ENS Jon E. Long, USNR, attends George Washington University and ENS William F. Kellermeyer, Jr., USNR, is from West Virginia University.

As part of their indoctrination these men were given tours of NAS Norfolk, NAS Oceana and Naval Station, Norfolk. Each one was checked out in the ejection seat trainer and low pressure chamber. This was followed by participation in the swimming course. They were able to average several hops in operational aircraft. The highlight was a 10-day cruise on USS RANDOLPH during which they received a basic introduction to Naval medicine as practiced aboard ship as well as the opportunity to observe air operations. They also toured the U.S. Naval Hospital, Portsmouth, Va.

During their tenure at the Safety Center, they were given the opportunity to observe and learn about the various problems encountered in aviation safety as well as participate in research projects of their own. Also included was a short course in experimental design given to further their knowledge of research and to benefit their medical education.

#

Enclosure (1)

SCUBA AND NAVAL AVIATORS

by

LT Robert C. Karlsberg  
Flight Surgeon, HMM 361Introduction:

The hazards of ejection, descent, sea survival and rescue are well known to the naval aviator. This communication warns of a lethal hazard to aviators which has previously never been emphasized.

After an overwater ejection, with a standard parachute and normal descent, a man will sink 5' to 15' beneath the surface of the water, and he will immediately resurface. If the aviator continues to breathe from his independent oxygen supply while beneath the surface of the water, he will be breathing from a scuba or self-contained underwater breathing apparatus.

Although the aviator may be scuba breathing for less than 10 seconds, he will, nonetheless, be vulnerable to the same hazards as every scuba diver. The most frequent cause of scuba death is panic which results in pneumothorax (collapsed lung) and air embolization (air bubbles in the circulatory system).

Physics:

The potential problems of scuba diving are numerous. Air embolization and pneumothorax are the most serious and most pertinent to the aviator who ejects over water.

Example 1:

If a man swimming on the surface of the water (without a scuba) holds his breath and skin dives to 33' beneath the surface, the volume of air in his lungs at the 33' level will be one-half the initial volume measured at the surface. Conversely, as he ascends without exhaling, the volume of air contained within his lung will gradually increase to the original pre-dive volume.

Boyle's Law.

$$(\text{pressure \#1}) (\text{volume \#1}) = (\text{pressure \#2}) (\text{volume \#2})$$

This is a mathematical description of the physical principal that the volume of a given mass of gas is inversely proportional to the pressure applied to that mass of gas. In the case of the above illustrated swimmer:

$$p\#1 = 1.00 \text{ atmospheres (MSL)}$$

$$v\#1 = 4,000 \text{ cc. (in lungs after maximum inspiration)}$$

$$p\#2 = 2.00 \text{ atmospheres (at 33 feet)}$$

$$(1.00) (4,000) = (2.00) (v\#2)$$

$$2,000 \text{ cc.} = v\#2$$

## Enclosure (1)

That is, the volume of air in the swimmer's lung at 33', if he has not exhaled, is 2,000 cc.

Example 2:

Conversely, consider a scuba diver swimming at 33'; if he takes a deep breath of pressurized air at this depth and ascends to the water's surface without exhaling, what will be the volume of air in this scuba diver's lungs when he reaches the surface?

$$\begin{aligned} p\#1 &= 2.00 \text{ atmospheres (at 33 feet)} \\ v\#1 &= 4,000 \text{ cc. (in lungs after maximum inspiration)} \\ p\#2 &= 1.00 \text{ atmospheres (MSL)} \\ (2.00) (4,000) &= (1.00) (v\#2) \\ 8,000 \text{ cc.} &= v\#2 \end{aligned}$$

The lungs would explode (pneumothorax) and the blood vessels would tear open permitting pressurized air to enter the circulatory system (air embolization).

Example 3:

Finally, consider an aviator who has ejected and continues to breathe from his independent oxygen supply. After reaching the surface of the water, he may well sink to an arbitrary depth of 11' (11' = 1.3 atmospheres). If at that depth he inhales from his pressurized gas source, and holds his breath until he ascends to the surface, what is the volume of air in his lungs at the surface of the water?

$$\begin{aligned} p\#1 &= 1.3 \text{ atmospheres (at 11')} \\ v\#1 &= 4,000 \text{ cc. (in lungs after maximum inspiration)} \\ p\#2 &= 1.0 \text{ atmospheres (MSL)} \\ (1.3) (4,000) &= (1.0) (v\#2) \\ 5,200 \text{ cc.} &= v\#2 \end{aligned}$$

Pneumothorax and air embolization could easily occur!

Discussion:

Pneumothorax and air embolization are lethal hazards to scuba divers and aviators. This problem has never before been stressed to the aviator.

The pressurized oxygen system carried in the seat pan is an excellent piece of gear and can be used to scuba dive to a depth of 20'. As with any scuba, the diver must exhale while ascending to a more shallow level.

With a conventional scuba, the diver need only relax while ascending; as the gas in his lungs expands, it will escape from his mouth. However, with a pressure

Enclosure (1)

breathing mask, a conscious effort to exhale must be exerted by the aviator as he ascends from his brief submarine voyage.

Considering the rapidity with which the aviator resurfaces and the potential panic, there is little doubt that the pilot may well hold his breath and valsalva while ascending. A pneumothorax and/or air embolization may result.

Recommendations:

1. Aviators who have ejected should remove their oxygen mask when below 10,000' and prior to contact with the water.
2. If an aviator has not time to remove his mask prior to submersion, he must:
  - a. make a forceful effort to exhale as he ascends and
  - b. remove his mask prior to ascending, if practical.
3. Training for aviators should include the pertinent hazards of scuba diving.

#

Dr. Robert C. Karlsberg is a graduate of the University of Michigan Medical School and interned at the University of California Hospital in San Francisco; he will soon begin a residency for eye surgery. Dr. Karlsberg is a member of the National Association of Underwater Instructors and is an F.A.A. commercial pilot and medical examiner. He is presently the flight surgeon for HMM 361 in Vietnam.

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# Flight Surgeon's NEWSLETTER

(This material is for the information of Navy flight surgeons only and does not necessarily reflect endorsement by the Navy or the Naval Aviation Safety Center.)

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BUMED-52:aab  
8 August 1967

## MEMORANDUM FOR ALL FLIGHT SURGEONS

Subj: Changes in visual standards for naval aviators

Ref: (a) MANMED Page Change 39 of 7 July 1967  
(b) MANMED 15-62(11)(b)  
(c) MANMED 15-62(11)(c)  
(d) MANMED 15-62(21)(c)  
(e) MANMED 15-62(21)(a)  
(f) MANMED 15-67(1)(a) and (b)

1. Reference (a) revises and updates certain portions of the Aviation Section (Section V), Chapter 15 of the Manual of the Medical Department. The most important changes are concerned with the visual standards for Service Group I aviators.

2. Basically the new change, as set forth in reference (b), lowers the standard for visual acuity for Service Group I to 20/50 and requires the wearing of glasses while flying when the visual acuity is less than 20/30. Attention is invited to reference (c) which requires the corrected visual acuity be recorded in the right-hand portion of item 59 and the corresponding prescription will be entered in item 60 of SF 88.

3. As a precautionary measure, the total myopic and/or astigmatic error is limited to a total of -1.25 diopters by reference (d). Reference (e), which was modified by page change 37 of 24 April 1967, now requires the report of a refraction in item 60 of SF 88 whenever the visual acuity falls to 20/30 or below and subsequently whenever a further decrement in visual acuity is recorded.

4. To avoid misunderstanding, it is emphasized that the broadening of Service Group I visual standards encompasses only minor degrees of myopia and/or astigmatism. Changes due to presbyopia are excluded. Defective accommodation, as before, will require an aviator to be placed in Service Group II, as will refractive error in excess of those noted in references (b), (c) and (d). It should be noted that there has been no change in the visual acuity standards for candidates for flight training, nor in the maximum hyperopic error allowed (reference (f)).

5. It is essential that aviators who are required to wear glasses to qualify for Service Group I flight status be fitted with spectacle frames which are compatible with their flight gear. The only frame approved for pilot use is the flying goggle (FG-58) frame which has been issued to aircrewmembers as aviators' sunglasses, either prescription or plano for the past several years. This frame is standard for flight personnel in the Army, Navy and Air Force. These frames have been thoroughly evaluated both from a comfort standpoint and for compatibility with standard flight helmets, oxygen masks and the full pressure suit helmet.
6. Experience with the frame on sunglasses has shown that with proper fitting and adjustment, the spectacles possess the necessary degree of security and field of view for wear during carrier operations. Flight Surgeons must assure themselves that each pilot, wearing either clear or tinted (N-15) prescription lens, has the proper frames individually adjusted to his face.
7. Prescription glasses are ordered on DD Form 771 (Apr 1954 or Dec 1966) and a separate form is required for each type of spectacle ordered. If clear glasses are desired, check the block indicating "Flying Goggles - Clear" on the form. If sunglasses are also being ordered, fill out a second form, checking the block marked "Sunglasses - N-15", or noting this same information under "Details" on older DD Form 771.

W. M. SNOWDEN  
Captain, MC, USN  
Assistant Chief for Aerospace Medicine  
Bureau of Medicine and Surgery

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#### INVESTIGATION OF FATAL ACCIDENT DISCLOSES CASE OF ADVANCED MILITARY

During an FMLP approach a T-28C crashed with the pilot sustaining fatal injuries. Autopsy disclosed advanced military tuberculosis of the lungs, spleen and liver. Indications were that the pilot was unaware of the presence of the disease. The pilot was taking a commercial cold tablet containing antihistamine for what he apparently thought was a cold although blood-stained handkerchiefs were found in his laundry. This case exemplifies the dangers of self-medication and the desirability of flying personnel consulting a flight surgeon whenever they do not feel up to par.

Accident: Preflight, start, taxi, engine runup and take off at 1245 were normal. The flight sequence was to include two normal touch and go landings

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and six FCLP landings. The pilot's first approach and landing were uneventful. On the second pass, he was high coming out of the approach turn. When told to "ease it down," he responded incorrectly by raising the nose and was waved off. On the next approach, his first FCLP, he was long in the groove and slow. When told to add power, he did not respond and was waved off. The wave off was executed properly. He was again long in the groove on his last approach although airspeed was correct for this point in the pattern. At the point where he should have rolled wings level, the aircraft started to increase its angle of bank to the left. A wave off signal was given with the mirror lights and radio with no response evident. As the angle of bank increased, the nose came up and then as the aircraft became inverted, the nose dropped toward the ground. The aircraft struck the ground left wing first in a nose low attitude.

Self-Medication: The pilot's roommate stated that the pilot, several days before the accident, had told him that he was coming down with a cold. He also told him that he was taking "X" tablets (a commercial, non-prescription cold remedy containing antihistamine) and that he always took this when he started to get a cold. The roommate stated that a new packet of 10 tablets was on the pilot's dresser as late as Friday night before the accident on Tuesday. After the accident there were only four capsules remaining.

This particular tablet is a depressant whose effects vary widely among users, becoming more adverse as the dosage increases. It contains belladonna alkaloids, scopolamine, phenylpropanolamine hydrochloride and chlorpheniramine maleate, the investigating flight surgeon reports. Directions with the drug state that driving and the taking of these tablets should not be combined. Under no circumstances, investigators said, should this cold remedy be taken less than 12 hours before a flight.

If the pilot was taking the capsules, his mental alertness, physical responses and vision could have been adversely affected. In this connection it might be noted that three days before the accident, the squadron commanding officer wrote on the pilot's grade sheet following his second dual hop that the pilot was slow and let the aircraft fly him. "He seemed to be almost in a daze, just along for the ride. Hopefully, merely an off day."

Medical History: The pilot had a physical examination upon entry into pre-flight approximately a year before the accident. At the time he received a waiver for an esophoria with deficient PD at 20'. A photofluorogram of the chest was read as negative. Six months later he had a routine PPD which was read as positive. A follow-up chest X-ray was read as negative.

After the accident, the investigating flight surgeon and a radiologist studied the X-ray again and indicated that there was no irregularity in the X-ray to indicate the presence of tuberculosis.

The pilot's annual physical a few days after the X-ray disclosed no abnormal findings. The only time he had seen a flight surgeon at sick call during the period between his annual physical and the accident was for a complaint unrelated to respiratory disease. He had mentioned to his friends that he suffered frequent "colds."

Investigators were unable to find conclusive evidence that the pilot had eaten breakfast or anything else the day of the accident. The autopsy revealed no gastric contents. Either the tuberculosis or the cold tablet ingestion would have been enough to slow down head work; taken together, they must have had a tendency to be overwhelming, the flight surgeon stated, and their effects could only have been intensified by an empty stomach. The cause of the accident is recorded "undetermined." (The aircraft control column was burned away and the ailerons were damaged by impact and fire; consequently, a control function could not be ruled out.)

The accident board recommended that increased emphasis be placed on the dangers of self-medication, utilizing this accident as an example: "Flight students should be ceaselessly reminded that one of the most important functions of dispensaries and flight surgeons is to help the aviator fulfill his mission. The flight surgeon is an integral member of any squadron, training or operational, and should be consulted whenever the aviator is sick."

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#### FIELD TEST OF PROPOSED MEDICAL OFFICER'S REPORT FORM

Evaluation of a new "Common MOR" form is commencing this month. The letter below pertains. This letter together with the proposed Navy version of the new form will be included in a packet to be shipped to selected aviation activities sustaining aviation mishaps (accidents). Because each service -- Army, Navy, Air Force, Coast Guard -- requires certain additional information, this trial form will include information required by all services over and above that designated in the present Navy form. A listing of this additional data is given below. Please obtain the additional information as you investigate because your "Common MOR" packet will be sent along to you after you have submitted all the data requested on the present MOR form.

#### FORWARDING LETTER TO ACCOMPANY EVALUATION PACKET

From: Commander, Naval Aviation Safety Center  
To: Medical Member of Board

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Subj: Evaluation of Proposed Medical Officer's Report of an Aircraft Mishap Investigation

Encl: (1) Proposed Medical Officer's Report  
(2) Instructions for completing proposed Medical Officer's Report

1. The Navy, in cooperation with the Army and the Air Force, is developing a new form for the Medical Officer's Report (MOR) of the investigation of an aircraft mishap.
2. Proper development of this MOR makes it desirable to field test it prior to printing. For this reason we are requesting your cooperation in completing the attached form (enclosure (1)) to assist us in this field evaluation. Instructions are attached as enclosure (2) and evaluation of these is also required prior to adoption of a new form.
3. The new MOR is approaching the final format and will be identical, insofar as possible, for all Services. It is desired, however, to incorporate worthwhile suggestions from the field in the final format.
4. Your cooperation in completing this sample form (in addition to the present form 3750-8, which must still be submitted) will be greatly appreciated, as well as your frank comments on its adequacy, and that of the instructions. We realize that it is lengthy, but feel that the factors needed to provide standard data elements for an automated analysis are more clearly delineated than on the present form, and that they will prove to be less ambiguous and easier to report than at present. Forms will be sent you as soon as we at the Naval Aviation Safety Center learn of an accident. It is extremely difficult to conduct valid studies based on data as reported at present and on the narrative accounts which contain widely variable elements.
5. Pictures, survivor's statements and other supporting documents should continue to be submitted with the present form only. Please return the proposed form upon completion directly to:

Aeromedical Department  
Naval Aviation Safety Center  
Naval Air Station  
Norfolk, Virginia 23511

6. In the event that questions arise which cannot be answered by referral to the instructions, please feel free to call the Naval Aviation Safety Center, Aeromedical Department, Area Code 703, number 444-3321.

R. E. LUEHRS  
By direction

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ADDITIONAL DATA TO BE REQUESTED ON COMMON MOR FORM

General Data

Terrain clearance at time of emergency  
Cabin altitude  
Time at cabin altitude  
Ambient altitude at time of emergency  
Time at ambient altitude  
Cloud conditions and horizon at time of emergency  
Place in formation.  
Duration of flight

Injury Data (All Persons)

Days hospitalized  
Days in quarters

Background Data (Pilots Only)

Date and duration of last leave  
Type of last leave taken (ordinary, emergency, sick, etc.)  
Hours flown in last 24 and 48 hours  
Number of missions flown in last 24 and 48 hours  
Hours worked in last 24 and 48 hours  
Hours slept in last 24 and 48 hours  
Hours continuous duty prior to mishap.  
Hours continuously awake prior to mishap  
Hours duration of last sleep period  
Time in cockpit prior to flight  
Physiological and vertigo training - Type training, place accomplished,  
dates completed  
Total years of formal education

Egress Data (All Persons)

Location in aircraft, direction facing, use/nonuse of seat  
Method of escape/exit  
Intent for escape  
Exit used  
Cockpit/cabin condition after mishap (major/minor damage, habitable/  
not habitable/destroyed)  
Order of escape

Reason(s) for escape (fire, engine failure, launch failure, fuel exhaustion, etc.)

Communications prior to escape (distress signal, position fix, IFF)

Number of previous ejections, bailouts, other parachute jumps

Aircraft attitude at time of escape (either in flight or after ground/water impact)

Ejection/parachute training - Type, total hours, date and factor mishap

Egress problems air/ground/water - before, during and after

#### Ejection/Bailout Data

Time from emergency until escape attempt was initiated

Reason(s) for delay in attempting escape

Protective helmet - chin strap fastened/visor lowered before emergency, during egress, during chute landing. Chin and nape strap snug/loose

Zero lanyard - when connected. Factor in survival/non-survival

Automatic lap belt release - how released and problems

Removal of aircraft canopy - how

Body position at time of ejection - head, hips, feet, elbows

Method and type of seat separation

Method of deploying chute

Parachute damage and cause

Direction of drift/oscillation faced at chute landing

Distance dragged by chute

Parachute landing position techniques (direction of fall, muscle tension, arms/knees position)

Canopy deflation pockets - effectiveness

#### Survival and Rescue Data

Survival training - type training, course and sponsor, place accomplished, date completed and factor in survival

Time sequence for rescue events (as indicated on present Rescue Report - OPNAV Form 3750-13)

Number search and rescue hours

Rescue problems - alerting, communications, delays in departure, problems enroute, problems locating survivor, survivor's problems, rescue operations problems, survivor's physical condition

Factors that aided in rescue - training, suitability and availability of rescue vehicle and equipment, coordination of rescue efforts, etc.

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LET'S KEEP IN CONTACT

NAVAL STATION, ROTA, SPAIN: This is the largest U. S. Naval activity in Europe, consisting of 11 commands (including three afloat and CNA Spain), four officers-in-charge, and one detachment. The station is somewhat unique in that it is a combined aviation and submarine activity, with the medical services oriented in both directions. The community served by the station hospital numbers approximately 10,000 people.

The physical plant is, for the most part, adequate. Several additions to the hospital have increased the bed capacity to 52 beds. Other improvements include a new obstetrical suite, pediatric ward, and a greatly augmented X-ray capability. Outstanding support in those specialties not covered locally is rendered by the USAF at Torrejon (Madrid). Laboratory facilities and some additional office space are badly needed but the lack of them does not greatly detract from the effectiveness of the hospital. Thus, despite the isolation, Rota offers very fine medical care to the people.

Aviation activities are well covered. The senior medical officer and senior flight surgeon is CAPT R. E. Mitchell; the senior surgeon is CDR G. J. McClard, a designated naval aviator; LCDR J. E. Mullen is the station flight surgeon and looks after the VP squadrons which rotate through the station; LT A. J. Hoffman is the VQ-2 flight surgeon, and LT O. E. James III is the VR-24 flight surgeon. The optometry is handled by CDR M. J. Testa, who is no stranger to aviation activities.

Very active programs of hearing conservation and aviation safety are conducted by the aviation staff. Additionally, continued training is emphasized, with weekly staff meetings, ward rounds, visits by consultants from Torrejon, and a bi-weekly staff luncheon at which a professional paper is presented.

Needless to say, the lighter side of life is not neglected. This area is rich in history and Andalucia is noted for its ferias, fiestas, and bullfights; flamenco and sherry are a way of life. All are well-sampled and enjoyed.

CAPT R. E. Mitchell, MC

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AVIATION PHYSIOLOGICAL TRAINING

The article "TF-9J Crew Experiences Hypoxia," FSNL 9-67, p-4, stated that pilots and aircrewmen undergo oxygen chamber runs every two years. The new General NATOPS (OPNAVINST 3710.7D) has changed aviation physiological training requirements to every 36 months.

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SOUTHEAST ASIA SURVIVAL MEDICINE NOTES

This Attack Carrier Air Wing FIFTEEN handout was originally prepared by LT H. F. Davis, MC, some three years ago and was recently revised and updated by LT E. W. Hunt, MC. It is tailored to the F-4B but can be adapted by any squadron flight surgeon to the aircraft in his outfit.

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If, through the vicissitudes of fortune attendant to flying over hostile territory, you should find yourself on the ground in said hostile territory, your ability to survive, evade, and escape will depend to a great extent upon your knowledge and practice of survival medicine. You will be ever alert to the obvious enemy but you need also to be alert to the enemies called disease, injury, exposure, poisoning, and a host of others associated with your survival situation. These last mentioned enemies are just as dangerous, real and omnipresent as the enemy soldier and will work relentlessly hand in hand with him to aid in your capture, confinement, or death. Just as you have basic requirements for either defense or evasion from enemy troops, you also have basic requirements for defense or evasion from the effects of environmental enemies.

1. A thorough knowledge of first aid.
2. A basic knowledge of the diseases prevalent in the area, their prevention, symptoms and treatment.
3. A basic knowledge of sanitation principles.
4. A knowledge of primitive medicine, i.e., the care of injuries and illness utilizing meager medical supplies.
5. A thorough knowledge of all your survival equipment especially medical supplies.
6. As much knowledge as possible about the people, their language, habits and customs.
7. A knowledge of the animals and plants of the area; which ones are beneficial and which ones are dangerous.

This probably sounds like an impossible amount of knowledge to assimilate; however, you already have a pretty good knowledge of #1 and #3 which are largely common sense. This treatise elaborates on #2, #4 and #5, gives a review of #1 and #3, and your AIO will fill you in on areas #6 and #7.

Other things that will help you a great deal in a survival are:

1. The Importance of the Mental Element in Survival (Ref: NAVWEPS #00-80T-56)
  - a. Stubborn attitude towards any survival situation.

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Enclosure 1

- b. Don't take "it can't happen to me attitude". Brother, it can!
- c. Reorganize in the moment of crisis. Use all you can recall from previous experiences, training and knowledge. Use any and all equipment and materials you have available to you.
- d. Be optimistic. Face reality. Don't dream, help yourself, no one else will. Believe that rescue is on the way.
- e. Arrange for basic needs as soon as it is possible.
- f. Set definite goals and follow a definite plan.
- g. Cope with your fears. Never be ashamed of fear. Never let it control you; you control it.  
Think positively. REMEMBER

- A) Training prevents panic.
- B) Fight loneliness any way you know how.
- C) Do not allow old childhood fears to haunt you.
- D) Keep busy; however, avoid overexertion.

- h. Fit yourself to the country. (Act like the natives.)
- i. Above all, DON'T GIVE IN TO ANYTHING!!!

2. Your immunizations (courtesy of the Medical Department) will wipe out your worries about a whole host of dread diseases which will be running rampant in the local populace. Check up on them yourself. Do you have all your shots?

3. Any experience in the field, i.e., camping out, will help you to some extent.

4. Good physical condition is a must. Don't burden yourself with 20 lbs of fat to lug through the rice paddies and jungle; turn it into muscle now!

Let us leave generalities now and move on to specific situations. Naturally your ability to begin medical care for yourself will depend to a great extent upon how quickly you must begin evasive measures, but in any case it should begin as soon as possible.

It begins with a survey of your situation. Determine the extent of your injuries and the equipment you have for caring for them. Take care of all injuries no matter how slight and take care of them properly. The following suggestions will be helpful.

1. Bleeding: A compression dressing will stop 90% of bleeding wounds in about 10 minutes. The rest will be stopped by a tourniquet and compression dressing. Try the pressure dressing first. If you use a tourniquet, 20 minutes is probably long enough, then loosen it slowly and note whether bleeding has stopped. If not, reapply for another 20 minutes.

2. Fractures: Splint these as best you can, a joint above and a joint below must be immobilized. Don't worry about correct alignment, immobilization

is most important. Your boot, reinforced with parachute cord makes a fair foot or ankle splint. Sticks tied to the outside of your anti-G suit make a good leg or knee splint. A parachute panel wound tight around your torso will bind your upper arm and splint it well or also help broken ribs. Keep the fractured limb elevated as much as possible. Don't put a compound fracture (bone sticking through skin) back inside. Just splint, dress, clean the wound, and take antibiotic. (Tetracycline pills.) A bundle of reeds laid parallel to each other will splint a forearm as will a large diameter bamboo splint lengthwise.

3. Wounds: Should be cleaned with soap and clean water, boiled water is better, treated water is OK, swamp water is taboo, and urine is OK if it is fresh. Deep wounds should be packed wide open (once bleeding has stopped) by pushing a corner of a sterile dressing into the wound. Inspect the wound while washing it to remove all obvious foreign matter, i.e., sticks, dirt, leaves, clothing. Cover the wound with a clean dressing and keep it dry if possible. Don't pour antiseptic into the wound.

4. Burns: First degree (redness only), leave them alone. Second degree (blister) - cover with sterile or clean dressing. Don't pop the blisters; when blisters break use antibiotic ointment in small amounts on them. Wash frequently and dress them daily. Third degree (skin charred) - cover with sterile dressing and antibiotic ointment.

All of the above mentioned items need to be cared for as soon as possible, definitely before traveling or securing food or shelter. Having cared for these, it is time to reappraise your situation. Can you travel? Would a change in location increase your chances of rescue, evasion, or survival? Is there better food, water, shelter, or climate to be gained by moving? How much equipment should you take? Will a change in location decrease exposure, insects, contact with unfriendly animals and humans, etc? Some help in answering these questions will come from the good information that A.I. has put out. You decide and then you act. If possible take a panel or two from your parachute along with all the equipment you possibly can without overburdening yourself. Keep your flight suit, anti-G suit, boots, and gloves on at all times when traveling for protection against thorns, insects and snakes. It is time now to think of PREVENTION.

Take care of your feet—they are your only vehicle in escape and evasion. Put on dry socks when possible, air-dry your feet in sunlight daily if possible. Rub chapstick or candle wax on blisters. Cook all food except tree-ripe fruit, boil or treat all water (boiling 20 minutes is better). Take care in selecting new foods. Attend to new injuries at once. Keep yourself as clean as possible. Use insect repellent and netting at all times. Inspect daily for leeches and ticks. Don't let your medical guard down if rescued by friendly natives or if captured.

Diseases prevalent in Southeast Asia:

1. Malaria: Prevented by taking anti-malaria pill (#12 in SEEK Kit) 1/week. If captured make every effort to save these. You still have 1-2 weeks before symptoms develop even without pills. Symptoms are severe chills and fever.
2. Trachoma: A very prevalent type of conjunctivitis (Pinkeye) which causes blindness. Symptoms are itching, pain, and mattering of the eyes. This is easily treated by eye ointment (#6 in your SEEK Kit) or by tetracycline tablets (#15 in SEEK Kit), one tablet four times daily.
3. Diarrhea: If no fever is present and you merely have the squirts, avoid roughage, i.e., fruits and vegetables; eat meat and meat broth (bouillion broth). Take in plenty of liquids along with 1-2 salt tablets per pint. Anti-diarrhea tablets (#11 in your SEEK Kit) may be all you need. Take 2 tablets 3 times a day; do not overdose. If fever is present, or blood, pus, or mucus are passed in quantity, take tetracycline tablets; one, four times daily in addition to the above treatment. A teaspoonful of powdered charcoal or bone powder every 4-6 hours may be beneficial.
4. Leeches: Use leech repellent (#8 in your SEEK Kit). Whenever you have been wading or walking through brush or grass, inspect for leeches. These should be removed gently by pulling or they will detach if touched with a salt tablet, lighted cigarette, iodine tablet or tobacco juice. Always smear a small amount of bacitracin ointment and apply a band-aid on the site of attachment. Keep pants legs tied tight around boot tops when wading or walking through brush.
5. Insect bites: Prevented with repellent (#3, 5, 8 in your SEEK Kit). If no repellent is available, use green wood smoke to smoke up exposed parts. A paste of aspirin and animal fat makes a good anti-itch cream. Ticks and lice will be around especially in areas of civilization, i.e., villages and POW camps. These will burrow into the skin and suck blood. Inspect yourself frequently and pick off ticks or lice whenever they are found if they are not attached. If a tick is burrowed into your skin, apply heat (gently), insect repellent, kerosene, or tobacco juice to cause him to back out. Treat the site of his entry with soap and water and bacitracin ointment (#10 in your SEEK Kit).
6. Rashes: If a skin rash is wet and weeping it will usually get better by drying it. If dry and cracking, oil or wax it. Bathe and air-dry arm pits and groin areas daily.

FOR OFFICIAL USE ONLY  
Enclosure 1

7. Sore throat: Most will get better with hot salt water gargles. Severe sore throats accompanied by fever may require tetracycline tablets.

8. Fever: Take aspirin (#9 in your SEEK Kit), two tablets every four hours and force liquids. Begin tetracycline tablets if the fever lasts over 24 hours.

9. Worms: You are more likely to acquire these around civilization. Diagnosis is obvious: worms will appear in stools. Treat with kerosene or gasoline, 1 tsp. daily for 4 or 5 days. (This is not recommended by all medical authorities. Serious liver and kidney damage or pneumonia may result. --Ed)

10. Heat exhaustion: Symptoms are weakness, nausea, sweating, and muscle cramps occurring after exposure to heat. It is caused from lack of salt lost via perspiration. It is prevented by taking 1-4 salt tablets daily. It is treated by rest, water, and salt tablets (#18 in your SEEK Kit).

11. Snake bites: Most snakes are in the south of Viet Nam. There are 38 poisonous species. Sea snakes are found in coastal waters or brackish waters. These are only mildly poisonous. Pit vipers are found in swamp and foot hill areas. Cobras are found in thick brush areas. Kraits (most poisonous) and coral snakes are found in jungle areas.

#### RULES FOR PREVENTION OF SNAKE BITE:

- a. Treat every snake as poisonous.
- b. Beware of areas where snakes are prevalent, i.e., thick brush, rocky ledges.
- c. Keep well covered clothing-wise.
- d. Use a stick to probe suspicious areas before proceeding.

#### IF BITTEN:

1. Kill or chase away the snake (spend only a few moments at this).
2. Lie down, place the bitten part below the level of the heart.
3. Tie a loose tourniquet above the bite 2-4".
4. Take tetracycline tablets, one every 6 hrs.
5. Don't cut into the bite site.
6. Rest as much as possible; remain right where you were bitten for at least 24 hours.
7. The maximum effect of the venom will occur in 24-36 hrs. After that time you will get better.

12. Infection: By far the most important problem to your survival will be the prevention and treatment of infections. If you have sustained broken skin injuries upon landing, some of these will likely become infected. The moist climate, heat, and less-than-ideal hygiene all work together to encourage infection in the most minor wounds.

Infection is characterized by inflammation and pus. Inflammation is redness, swelling, pain and warmth surrounding a wound. Inflammation indicates your body's response to an invading organism or germ. With a little help from you, your body can always win this battle. Inflammation will spread to involve a larger area if the germs are winning the battle. This spreading of inflammation to places away from the original wound is called cellulitis or "blood poisoning."

There may be red streaks up the arm or leg and painful swollen glands in the arm pit or groin. If inflammation of a wound is noted the following should be done:

1. Rest the affected part.
2. Apply hot compresses to the affected part.
3. Elevate the affected part.
4. Take two (2) tetracycline tablets four (4) times daily.

The inflammation will slowly begin to subside over a few days. It may go away altogether or it may condense down into an abscess. An abscess is simply a pocket of pus, i.e., boil. If it is apparent that an abscess has formed, open the area widely with an X-shape cut. Express the pus gently and pack the wound open. Keep it open by repacking daily or more often. Continue hot compresses and allow the wound to heal from the bottom up. In a large, badly infected, dirty wound, maggots are helpful. They will eat only the dead tissue, and keep the wound clean and open. No need to look for them, they will find the wound if it is left open.

\*\*\*

The following is a list of items of a medical nature carried in the SEEK I and II Combat First Aid Kits and ejection seat pan in F4B Phantom aircraft. The item is listed, then the number present in each kit, and then the number of that item considered to be adequate. Items considered unnecessary by the medical department are listed at the end of this section. Explanations of the indications and usage of medicines is given. An additional list of strongly recommended additions follows.

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Enclosure 1

Seat pan F4B Phantom = (P)  
SEEK I and II = (S)  
Combat First Aid Kit = (C)

All crew will carry (C) (issued by AIO), SEEK I and II Kits (S).

Tetracycline tablets (anti-infection), (C) 15 (P) 16 (S) 15. Total 46 recommended 47.

These are an effective antibiotic which will work in most severe infections, i.e., cellulitis, pneumonia, diarrheas with fever, kidney infections. They should not be taken prophylactically, i.e., to prevent infection, but only when you are reasonably sure that an infection exists. Once started, they should be taken for at least five (5) days and possibly for seven (7) days. Even if you are much better the second day, keep taking the pills. Dosage for severe infections, two tablets four times daily for two days then one tablet four times daily for three more days.

Morphine syrettes,  $\frac{1}{4}$  grain (C) 2, total recommended (2). This is a potent anti-pain preparation which will relieve pain regardless of cause. It should not be taken unless severe pain is present, i.e., fractures, severe burns, large and very painful wounds. You may need to use these later to perform some surgery upon yourself, i.e., to set a fracture, so don't waste them on a skinned knee.

The morphine comes in a tube with a sterile needle which needs to be pushed in to break the seal on the tube. The plunger is then withdrawn and the needle plunged deep into the thigh muscle. The contents of the tube is squeezed in. Relief of pain will begin in 20 minutes and last 4-6 hours. Use only one of these at a time as both together may be dangerous.

Chloroquine Primaquine tablets, (P) 8 (S) 8. Recommend eight (8).

This medicine is a malaria preventative, it is the most valuable medicine of any kind that you have. Take one tablet each week to prevent malaria.

Surgical Soap, (P) one small bar (S) one-eighth oz. liquid, one small bar "Dial" soap, recommend 4 oz. bar. This anti-bacterial soap will be one of your most useful items; use it to scrub all minor wounds and scratches. Use only a small amount at a time with a lot of water. It is not a hand soap.

Bacitracin-Neomycin Ointment, (P) 0 (S) one tube (C) 0. Recommend 1-2.

FOR OFFICIAL USE ONLY  
Enclosure 1

This is an antibiotic eye ointment which will cure nearly any type of eye infection. It will cure Trachoma which is the most serious of the "Pinkeye" type infections. Don't use it for simple eye irritations caused by allergy, dust, or perspiration. Dosage: Use a small amount four times daily for five days. To apply: Look upwards, pull lower lid down, and place a small dab inside the lower lid.

Halazone or water purification tablets, (P) 50 (S) 50 (C) 0

Recommend at least 100. These tablets will purify impure water and will kill most harmful bacteria in about 10-20 minutes. It is best to strain out most of the larger fur bearing animals and particulate matter with parachute silk or chamois before adding the iodine tablets. Obtain as clean a water sample as possible, then add the tablets. Wait at least 10 minutes, shaking the water to dissolve the tablet. Dosage: One tablet per quart of water.

Salt Tablets, (P) 6 (S) 24 (C) 0

Recommend at least 50. This is a necessity for persons unacclimated to a hot climate. Salt will be lost through perspiration, urination, and diarrhea. It must be supplemented by salt tablets unless a high meat diet (unlikely) is available. Take one with each quart of water. These may be crushed and sprinkled on food to make it more palatable. They can be gargled in hot water for sore throats, or they can be applied to leeches to remove them. They can be added to broth in treating diarrhea in order to replace salt lost.

Anti-Diarrhea Tablets, (P) 0 (S) 12 (C) 0

Recommend at least 12. These are effective in stopping most watery diarrhea in conjunction with other measures suggested on page four. Dosage: Two tablets three times a day. Do not overdose.

Aspirin or APC Tablets, (P) 11 (S) 11 (C) 0

Recommend at least 22. These are useful for relief of minor discomfort but better saved for treating fever. A paste of one or two applied to insect bites will prevent itching. Dosage for fever: two tablets every four hours.

Alertness (D-Methamphetamine) tablets, (P) 6 (S) 5 (C) 0

Recommend at least 6. These are an energizer useful in combating fatigue and preventing sleep. They would be most useful in an escape, evasion situation where you had to remain alert and keep going. If you have used these to keep going for 48 hours straight then you can expect a tremendous slump when they

wear off. The fatigue you have prevented will all catch up with you at once and you will note extreme drowsiness, lethargy, depression and weakness. Use carefully and wisely. Dosage: one tablet every 4-6 hours.

Meclizine (motion sickness) Tablets, (P) 0 (S) 6 (C) 0

Recommend 6. This will be useful only in a life raft situation. They will not help vomiting from causes other than motion sickness. Dosage: one tablet daily.

Benzalkonium Chloride (Zephiran), (P) 1 bottle (S) 0 (C) 0

Recommend one bottle. This is an antiseptic for minor scratches and bites. Not as effective as either soap and water or Bacitracin ointment. Don't pour this into deep wounds.

Chapped Lips - Sunburn protector stick, (P) 1 (S) 1 (C) 0

Recommend 2. Useful for the obvious anti-chap and anti-sunburn functions. Also for applying to blisters and tender spots on the feet, waterproofing boots, covering burns, a lubricant for general purposes.

Sun and bug repellent, (S) 4 (P) 1 (C) 0

Recommend 4. Apply as directed to exposed areas of skin. Use also on legs prior to wading to prevent leeches from attaching and to discourage underwater bugs. An insect repellent towelette is also in the SEEK kit.

Bouillon Cubes, (P) 0 (S) 1 (C) 0

Recommend one (1) vial. These are quite valuable medically but have very little food value. They should, therefore, not be used to satisfy momentary hunger pains, but should be saved for their more valuable medical use. A broth prepared from bouillon is very soothing to an upset gut, i.e., diarrhea, vomiting. In addition it replaces many of the necessary minerals which are lost through vomiting and diarrhea. Dosage: One cube to one cup of boiling water.

Razor Knife and Blade, (P) 1 (S) 1 (C) 0

Recommend 2. These are sharp pointed, razor-sharp blades which are useful in removing imbedded thorns, opening abscesses, trimming dead skin. They may be sterilized in a flame.

Tweezers, (P) 0 (S) 1 (C) 0

Recommend 1 pair. Useful for removing foreign debris from wounds, dressing wounds, and removing thorns.

Elastic Bandage 3" or 4", (P) 0 (S) 0 (C) 0

Recommend 1. Useful as a compression dressing in a bleeding wound or to bind up a sprained or swollen ankle, wrist, or knee. Comes packaged in a waterproof cover, available through Medical Department.

Bandages:

Gauze Compress - (P) 1 (S) 0 (C) 1 Recommend 1  
Gauze Bandage - (P) 0 (S) 0 (C) 0 Recommend 1  
Muslin Bandage - (P) 0 (S) 0 (C) 0 Recommend 1  
Adhesive Tape - (P) 1 (S) 0 (C) 0 Recommend 1  
Band-aids - (P) 6 (S) 6 (C) 0 Recommend 12

The uses for these are obvious. It is recommended that several be carried. Available through Medical Department on individual's request.

Bull Durham Brand Tobacco, type dry, strong, in sack, (P) 0 (S) 0 (C) 0

Recommend one or two 5-cent sacks. This preparation is carried by natives of Borneo and Malaysia and used to remove leeches, ticks, and lice. The sack is wet with water and the tobacco juice is squeezed upon the offending creature. The sack can be dried and reused many times.

The following are considered unnecessary items:

1. Boric Acid eye ointment (P).
2. Tetracaine eye ointment (P).
3. Benzalkonium chloride tincture (P) (one bottle max.).
4. Absorbent cotton (P).

The following is a summary list of recommended additions to your survival equipment:

1. Surgical soap 4 oz. bar.
2. Number 11 scalpel blades, 2 ea. available through Medical Department.
3. Salt tablets, 5 grains 50 tablets.
4. Elastic bandage 3" or 4": 1 ea. available from Medical Department.
5. Halazone tablets 50 tablets additional, total of 150, available through Supply Department.
6. Bull Durham Brand Tobacco, 1 or 2 sacks.

PREPARE, THINK, ACT, AND SURVIVE

FOR OFFICIAL USE ONLY  
No. 11 & 12/67

# Flight Surgeon's NEWSLETTER

(This material is for the information of Navy flight surgeons only and does not necessarily reflect endorsement by the Navy or the Naval Aviation Safety Center.)

## NEWSLETTER GOING ON QUARTERLY BASIS:

With this combined November-December issue of the Flight Surgeon's Newsletter, the Newsletter will go on a quarterly publication basis. Issues will appear in January, April, July and October. "Let's Keep in Contact" is being discontinued but articles on aviation medicine and survival equipment from flight surgeons in the field will be welcome.

####

## VP-49 FIRST AID KIT AND BUMED COMMENTS:

The following inventory of the contents of a first aid kit was received from VP-49 and forwarded to the Bureau of Medicine and Surgery. The quoted paragraphs commenting on the kit are from BUMED letter 52:vjo 6780 25 July 1967.

It should be noted that the FAA Aviation Medical Service's Guide to Drug Hazards in Aviation Medicine (AC 91.11-1) states that Lomotil can cause the following undersirable effects in aviation: nausea, depression, and slowed respiration, and that airman duties are contraindicated for 24 hours after use. Dramamine, per se, is not listed but, according to the Guide, when anti-motion sickness agents such as Bonamine are taken airman duties are contraindicated for 24 hours after administration of the usual dose. Therefore, the Safety Center points out that the problem of self-medication as related to such first aid kits will call for careful attention on the part of the flight surgeon and the commanding officer.

## Inventory of Contents of VP-49 First Aid Kit:

Plastic pharyngeal airway.  
Aspirin - two every three hours for pain.  
Dramamine - one every four hours for air sickness. Caution: Causes drowsiness.  
Lomotil - two every four hours for a total of 10 or until diarrhea stops.  
Antiseptic for cuts.  
Otrivin nose spray for sinus or ear block.  
Ammonia inhalants.  
Bacitracin ointment for abrasions.  
Tourniquet.  
Band aids, eye patch and sterile gauze. Sterile Q-tips for removal of foreign bodies from eye.  
Ace bandage.  
Ear solution for ear pain or drainage.

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Vaseline for burns.  
Bandage for tourniquet or sling (2).  
Gauze for use on top of sterile gauze.

BUMED Comments:

"First Aid Kit, Airplane (FSN 6545-919-6650) is authorized to provide medical material in naval aircraft for self-administered emergency treatment. Such treatment is directed primarily toward treatment of injuries. The contents of these kits have been chosen to best carry out such treatment, and are the standard items usually found in first aid kits used in various circumstances and environments. The kit developed by VP-49 contains similar items for use in cases of trauma. The additional items included in the proposed kit are ones used primarily for medical conditions that may arise during flight. An emergency, self-aid sick call kit has thus been developed by the squadron to care for those conditions which seem to arise most frequently. The items included are those considered by the squadron flight surgeon to be the most appropriate to carry. Another flight surgeon may desire entirely different items. Experience has shown that the development of a standard medical treatment kit which would satisfy all is not possible.

"This Bureau does not object to the development and use of specialized first aid and emergency medical kits by local activities, and interposes no objection to their use either by medical or nonmedical personnel as long as adequate control is maintained and that adequate training is given to proposed users. The ideas conceived by our various medical personnel along these lines are always welcomed, and it is believed should be given dissemination throughout our medical community...

"The incorporation of the pharyngeal airway in the subject kit is especially appropriate for multi-place aircraft such as the P-3, and it is believed that its inclusion as a part of standard medical equipment in all multi-place aircraft should be considered by cognizant medical personnel. This item (FSN 6515-660-0046 , Airway, Pharyngeal, Plastic, Adult-Child) is readily available from the Medical Material Catalog."

####

HUMAN ERROR RESEARCH AND ANALYSIS PROGRAM:

Resumption of contractual effort on the Human Error Research and Analysis Program is scheduled for November 1967. The human factors group at McDonnell-Douglas Aircraft Company will again be awarded the contract.

The following accomplishments summarize progress on nine specific assigned tasks:

1. Development of a data bank on the Center's Honeywell 1200 digital computer. At the present time the Master Aircraft Accident file and the Master Officer Data files have been programmed in Cobal Language and are on the machine. Pensacola training data has been obtained and will be processed and computerized in the next few months. Additional data will be added continually.
2. Development of data analysis methods.
3. Provision of mishap documentation guidelines.
4. Evaluation of mishap investigation methods.
5. Development of a Function/Task Analysis for a model of the A-4E aircraft. The use of this is in interface studies between the man and the machine.
6. Provision of bibliography and abstract stores.
7. Consultation of ten additional data sources including some in England and Canada.
8. Provision of subtask assistance on eight problems including an 88 factor correlation and factor analysis in the area of fractures on ejection.
9. Specific studies were designed for future application.

####

REMINDER TO ALL FLIGHT SURGEONS:

On a number of MOR's submitted to the Safety Center recently, certain items have not been completed properly or have not been completed at all. To keep records accurate and reliable for future research, we need the specific model designation along with the equipment description on page 5 under Escape, Personal and Survival Equipment. In addition, Training Factors (Section J) should be completed to the best of available knowledge. Your cooperation will be appreciated.

####

FIELD TEST OF PROPOSED MOR FORM:

Attached to this Newsletter is a copy of the proposed MOR form to be used by the Army, Air Force and Navy. As discussed in last month's Newsletter, not all flight surgeons will take part in this evaluation; accidents on which the new MOR is to be filled out will be selected by the Safety Center. The new MOR form attached is for your information only.

####



## PAGE 1 - MEDICAL OFFICER'S REPORT OF A/C ACCIDENT, INCIDENT, OR GROUND ACCIDENT

## II

## MEDICAL INFORMATION

1. Degree of injury:		2. Days hospitalized _____	4. Days grounded _____
1 - None <input type="checkbox"/>	5 - Missing, land <input type="checkbox"/>		
2 - Minor <input type="checkbox"/>	6 - Missing, water <input type="checkbox"/>	3. Days in quarters _____	5. Unconscious: _____ hours _____ minutes
3 - Major <input type="checkbox"/>	7 - Missing, unknown <input type="checkbox"/>		
4 - Fatal <input type="checkbox"/>			

5a. Disposition	5b. Exposure 1 - Mild <input type="checkbox"/> 2 - Moderate <input type="checkbox"/> 3 - Severe <input type="checkbox"/>	5c. Shock 1 - Mild <input type="checkbox"/> 2 - Moderate <input type="checkbox"/> 3 - Severe <input type="checkbox"/>
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6. INJURIES INCURRED DURING MISHAP.	Use standard DOD terminology for Body Part, Diagnosis and Cause of Injury	Leave these columns blank
-------------------------------------	---	---------------------------

[illegible][illegible]

Body Part:	P								
Diagnosis:	D								
Cause:	C								

[illegible][illegible]

7. LABORATORY TESTS	TISSUE TESTED	METHOD USED	LABORATORY DOING TEST	RESULT
Carbon monoxide				
Alcohol				
Lactic acid				
Other (Specify)				

8. X-RAY RESULTS:

9. DISEASES/ DEFECTS present at the time of the Mishap	Method of Discovery				Waivers (as applicable)	
	Annual Physical	Sick Call	Autopsy	Other	Authority	Date
DIAGNOSES						

10. AUTOPSY conducted by:		11. MATERIAL submitted to AFIP:	
M - Military Pathologist	<input type="checkbox"/>	F - Flight Surgeon	<input type="checkbox"/>
C - Civilian Pathologist	<input type="checkbox"/>	Y - Other	<input type="checkbox"/>
Protocol Attached	<input type="checkbox"/>	Will be forwarded	<input type="checkbox"/>
1 - Autopsy Report		<input type="checkbox"/>	3 - Pictures
2 - Frozen Tissue		<input type="checkbox"/>	4 - Fixed Tissue

12. List additional injuries received as a result of the mishap, and add any pertinent remarks:

NAME	SERIAL NO.	A/C	BUNO

**MEDICAL OFFICER'S REPORT OF A/C ACCIDENT, INCIDENT, OR GROUND ACCIDENT**

**IDENTIFICATION**

1. FROM (Name and mailing address of activity)				2. MOR NUMBER		3. DAMAGE CODE	
4. TYPE OF MISHAP Ground <input type="checkbox"/> Accident <input type="checkbox"/> Accident <input type="checkbox"/> Incident		5. NO. OF OCCUPANTS		6. DATE		7. MODEL A/C	
8. BUNO		9. MODEL OTHER A/C IF INVOLVED		10. BUNO		11. NO. OF OCCUPANTS	
12. DAMAGE CODE		13. INDIVIDUALS INVOLVED (Use additional sheets if required) NAME (Last, first and middle initial)		14. RANK/ RATE		15. BRANCH OF SERVICE	
16. DUTY BILLET		17. DIRECTION FACING AT TIME OF MISHAP		18. LOCATION AT TIME OF MISHAP		19. INJURY CODE	
20. DISPO- SITION		A.		B.		C.	
D.							

21. NARRATIVE ACCOUNT OF MISHAP (Use additional 8 x 10-1/2 sheets if required)

<b>I</b>				<b>FLIGHT DATA</b>			
1. Terrain clearance at time of emergency _____ feet				7. Cloud Conditions			
2. Cabin altitude at time of emergency _____ feet				3 - In clouds _____ <input type="checkbox"/>			
3. Time at cabin altitude _____ hours _____ min.				0 - Clear _____ <input type="checkbox"/>			
4. Ambient altitude at time of emergency _____ min.				4 - In and out of clouds _____ <input type="checkbox"/>			
5. Time at ambient altitude _____ hours _____ feet				1 - Overcast _____ <input type="checkbox"/>			
6. Place in Formation				2 - Undercast _____ <input type="checkbox"/>			
A - Single aircraft <input type="checkbox"/> Y - Other (specify) _____				8. Horizon			
L - Lead <input type="checkbox"/> _____				1 - Distinct <input type="checkbox"/> 8 - Other (specify) _____			
W - Wing <input type="checkbox"/> _____				2 - Obscured <input type="checkbox"/> _____			
				9. Duration of Flight: _____ hours _____ min.			
NAME		SERIAL NO.		A/C		BUNO	
_____		_____		_____		_____	

## III

## PSYCHOPHYSIOLOGICAL AND ENVIRONMENTAL FACTORS

INSTRUCTIONS: Complete on all occupants of aircraft, all injured persons, and all persons possibly contributing to the cause of the mishap. Supervisory factors attributed to persons not in the aircraft and such factors as design or weather should be reported only for the person in primary control of the aircraft. Factors contributing to injury during mid-air collisions, crash landings, ditchings, etc., are to be considered part of survival phase. Use codes at right to show only those factors present or contributing in each phase.

## PHASES OF MISHAP

A - Accident  
E - Escape  
S - Survival (includes parachute landings)  
R - Rescue

## FACTOR IMPORTANCE

D - Definitely contributed  
S - Suspected factor  
P - Condition PRESENT, but did not contribute to accident or injury

FACTORS		A	E	S	R	FACTORS		A	E	S	R					
<b>1. SUPERVISORY FACTORS</b>						Visual illusions						613				
Inadequate briefing	101					Unconsciousness						614				
Ordered/led on flight beyond capability	102					Disorientation/vertigo						615				
Poor crew coordination	103					Hypoxia						616				
Other (specify)	199					Hyperventilation						617				
						Dysbarism						618				
<b>2. PRE-FLIGHT FACTORS</b>						Carbon Monoxide poisoning						619				
Faulty flight plan	201					Boredom						620				
Faulty pre-flight of aircraft	202					Inattention						621				
Faulty preparation of personal equipment	203					Channelized attention						622				
Hurried departure	204					Distraction						623				
Delayed departure	205					Preoccupation with personal problems						624				
Inadequate weather analysis	206					Excessive motivation to succeed						625				
Other (specify)	299					Overconfidence						626				
						Lack of self-confidence						627				
<b>3. EXPERIENCE/TRAINING FACTORS</b>						Lack of confidence in equipment						628				
Inadequate transition	301					Apprehension						629				
Limited total experience	302					Panic						630				
Limited recent experience	303					Other (Specify)						699				
Failure to use accepted procedures	304															
Other (Specify)	399					<b>7. ENVIRONMENTAL FACTORS</b>										
						Acceleration forces, in-flight						701				
<b>4. DESIGN FACTORS</b>						Acceleration forces, impact						702				
Design of instruments, controls	401					Decompression						703				
Location of instruments, controls	402					Vibration						704				
Failure of instruments, controls	403					Glare						705				
Cockpit lighting	404					Smoke, fumes, etc.						706				
Runway lighting	405					Heat						707				
Lighting of other aircraft	406					Cold						708				
Personal equipment interference	407					Wind blast						709				
Workspace incompatible with man	408					Visibility restriction-weather, haze, darkness						710				
Other (Specify)	499					Visibility restriction-icing, windows fogged, etc.						711				
						Visibility restriction-dust, smoke, etc., in acft						712				
<b>5. COMMUNICATIONS PROBLEMS</b>						Weather, other than visibility restriction						713				
Misinterpreted communications	501					Other (Specify)						799				
Disrupted communications	502															
Language barrier	503					<b>8. OTHER FACTORS TO BE CONSIDERED</b>										
Noise interference	504					Habit interference, used wrong control						801				
Other (specify)	599					Confusion of controls, other						802				
						Misread instrument (s)						803				
<b>6. PSYCHOPHYSIOLOGICAL FACTORS</b>						Misinterpreted instrument reading						804				
Food poisoning	601					Misled by faulty instrument						805				
Motion sickness	602					Visual restriction by equip structures						806				
Other acute illness	603					Task oversaturation						807				
Other pre-existing disease/defect	604					Inadequate coordination or timing						808				
Get-homeitis	605					Misjudged speed or distance						809				
Hangover	606					Selected wrong course of action						810				
Sleep deprivation	607					Delay in taking necessary action						811				
Fatigue, other	608					Violation of flight discipline						812				
Missed meals	609					Navigational error						813				
Drugs prescribed by medical officer	610					Inadvertent operation self-induced						814				
Drugs, other	611					Inadvertent operation mechanically induced						815				
Alcohol	612					Other (Specify)						899				

NAME

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IV PERSONAL DATA

1. Role of this individual in the cause of the mishap:

A. Primary

1 - Definite ☐ 2 - Probable ☐ 3 - Possible ☐

B. Contributing

4 - Definite ☐ 5 - Probable ☐ 6 - Possible ☐

0 - None ☐ 9 - Unknown ☐

2. BACKGROUND DATA (Complete for ALL pilots and others who possibly contributed to Mishap)

A. Date last leave ended

B. Days duration last leave

C. Type of last leave taken

1. Ordinary ☐

2. Emergency ☐

3. Reenlistment ☐

4. Graduation ☐

5. Sick or convalescent ☐

6. Delay enroute ☐

9. Unknown ☐

D. Date of last previous flight

E. Hours flown in last 24 hours

F. Hours flown in last 48 hours

G. Missions flown in last 24 hours

H. Missions flown in last 48 hours

I. Hours worked in last 24 hours

J. Hours worked in last 48 hours

K. Hours slept in last 24 hours

L. Hours slept in last 48 hours

M. Hours continuous duty prior to mishap

N. Hours continuously awake prior to mishap

O. Hours duration of last sleep period

P. Time in cockpit prior to flight:

Hours Minutes

3. Physiological, Low Pressure Chamber and Vertigo Training (For All Personnel)

Type Training Accomplished	Place Training Accomplished	Completed		Role * in Mishap	* For Role in Mishap, Use Following Code: 0 = No Importance 1 = Training definitely helped 2 = Training possibly helped 3 = Lack of training definitely a factor 4 = Lack of training possibly a factor 9 = Unknown
		Month	Year		

4. Anthropometric Data (e through i for Navy only)

a. Date of Birth: Day Mo. Year	e. Trunk Height	inches
b. Height	f. Functional Reach	inches
c. Weight	g. Buttock - Knee Length	inches
d. Sitting Height	h. Leg Length	inches
	i. Shoulder Width (bideitoid)	inches

5. Number and type of prior mishaps (complete for all Pilots, Co-pilots, and/or Other Persons in Control of Aircraft)

a. No. b. Describe Type(s):

6. Total Years of Formal Education:

7. Chronological Account of Activities of Previous 72 hours. (For all Pilots, Co-pilots, and/or Persons possibly contributing to mishap):

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LOCATION IN AIRCRAFT

1 - Cockpit or Pilot's compartment

2 - Navigator's/Engineer's compartment

3 - Passengers' compartment (single deck)

4 - Passengers' compartment (upper deck)

5 - Passengers' compartment (lower deck)

8 - Other compartment

9 - Compartment unknown

Longitudinal Location

1 - Forward section

2 - Center section

3 - Aft section

4 - Section unknown

C.

1 - Forward

2 - Aft

3 - Sideward

9 - Unknown

Lateral Location

2 - Center

4 - Left side

5 - Right side

9 - Unknown

Use of Seat

0 - Not in seat

1 - In seat

2 - Bunk/litter

9 - Unknown

METHOD OF ESCAPE (More than one may apply)

Ejection

1 - Accomplished (free of aircraft)

2 - Attempted (not accomplished)

3 - Seat ejected on impact (terrain)

4 - Inadvertent ejection

7 - Unknown if attempt was made

8 - Suspected ejection

0 - Definitely not attempted

Bailout

1 - Accomplished (free of aircraft)

2 - Attempted (not accomplished)

3 - Bailed out after ejection attempt failed

7 - Unknown if attempt was made

8 - Suspected bailout

0 - Definitely not attempted

Other

A. Standard emergency ground egress

1 - Underwater egress (not ejection)

3 - Did not escape

4 - Exit unassisted (other than stand. emerg. ground egress)

5 - Carried/assisted out

6 - Blown/thrown out

7 - Jumped from a/c (airborne)

8 - Unknown if escape accomplished

9 - Escaped, method unknown

INTENT FOR ESCAPE

1 - Intentional

2 - Unintentional, self-induced

3 - Unintentional, mechanical

4 - Intent unknown

EXIT USED

1 - Normal exit

2 - Ejected through canopy

3 - Emergency exit

8 - Other

9 - Unknown

COCKPIT/CABIN CONDITION AFTER IMPACT

0 - No damage (other than canopy loss, etc.)

1 - Minor damage (definitely habitable)

2 - Reasonably intact (probably habitable)

3 - Major damage (probably not habitable)

4 - Destroyed (definitely not habitable)

9 - Unknown

ORDER OF ESCAPE (1st, 2nd, etc.)

REASON(S) FOR ESCAPE (More than one may apply)

A - Fire/explosion/ smoke

B - Loss of control

C - Engine failure

D - Fuel exhaustion

E - Structural failure

F - Mid-air collision

G - Water impact

H - Ground/structure impact

J - Launch failure

K - Arrestment failure

Y - Other

Z - Unknown

8. COMMUNICATIONS PRIOR TO ESCAPE

1 - Distress signal transmitted

2 - Position fix transmitted

3 - Emergency IFF (Manual)

4 - Emergency IFF (Automatic)

9 - Unknown

0 - None

9. NUMBER OF PREVIOUS:

Ejections

Emergency Bailouts

Other parachute jumps (training, skydiving, etc.)

10. TERRAIN OF PARACHUTE LANDING OR CRASH SITE (More than one may be applicable)

A - Open sea

B - Large lake

C - River

D - Deep water, other

E - Shallow water

F - Deep snow

G - Thick ice

H - Marsh/Swamp/Mud

U - Hard ground

J - Soft ground

K - Building

L - Flight deck

M - Dense woods

N - In trees

T - Through trees

P - Ravine/Steep slope

Q - Rocks

R - In/near fireball

S - Desert

Y - Unknown

Z - Other

11. AIRCRAFT ATTITUDE AT TIME OF ESCAPE (Either in flight or after crash, ditching, etc.)

1 - Nose up

0 - Nose down

1 - Right bank

0 - Left bank

A - Nose down spin

B - Flat spin

C - Oscillating spin

D - Rolling

E - Tumbling

F - Disintegration

G - Inverted

H - Mushing

Z - Unknown

Y - Other (describe)

12. EJECTION SEAT/PARACHUTE TRAINING (Not required for passengers who had no opportunity to escape)

Type of Training	Total Hours in Training	Date of Last Training	Role*
Lectures/Demonstrations			
Training Films			
Unarmed ejection seat			
Armed seat on tower			
Jump School			
Parasail training			
Other (specify)			

\* Use codes below to indicate role training played in this mishap.

0 - No importance

1 - Training definite help

2 - Training possible help

3 - Lack of training factor

4 - Lack of training possible factor

9 - Training role unknown

13. EGRESS DIFFICULTIES (Place X in Appropriate Column)

	B	D	A
A. AIR			
Buffeting			
G Forces			
Windblast			
Seat pins not removed			
Difficulty locating canopy jettison mechanism			
Hampered by clothing			
Hampered by equipment			
Hampered by injuries			
Difficulty releasing canopy/hatch			
Failure to release canopy/hatch			
Difficulty locating/reaching normal ejection mechanism			
Difficulty locating/reaching alternate ejection mechanism			
Face curtain failed to activate seat			
Face curtain problem (locating, reaching, etc)			
Seat pan firing handle failed to activate seat			
Seat pan firing handle problem (locating, etc)			
Canopy jettison problem			
Canopy jettison failure (automatic means)			
Could not open canopy/hatch			
Difficulty releasing restraints			
Difficulty reaching hatch/exit-obstructions			
Difficulty reaching hatch/exit-injuries			
Difficulty reaching hatch/exit A/C attitude			
Difficulty reaching hatch/exit equip hangup			

E

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13. EGRESS DIFFICULTIES (CONT'D) (Place X in Appropriate Column) B-Before D-During A-After

A. AIR (Cont'd)		B	D	A
Pinned down in A/C (other than equip hangup)	25			
Confusion/panic/disorientation	26			
Darkness - no visual reference	27			
Fire/smoke/fuel	28			
Anthropometric problem	29			
Personal equipment factor (other than hangup)	30			
Upper extremities hit cockpit structures	31			
Lower extremities hit cockpit structures	32			
Man struck canopy/canopy bow	33			
Struck external surface of aircraft	34			
Flailing - upper extremities	35			
Flailing - lower extremities	36			
Drogue slug swinging at man	37			
Drogue slug struck man	38			
Man struck by other equipment	39			
Man struck by seat	40			
Seat separation difficulty	41			
Seat/parachute entanglement	42			
Man tangled in chute risers - major	43			
Man tangled in chute risers - minor	44			
Parachute line over	45			
Man held on to seat	46			
Tumbling/spinning	47			
Parachute did not open	48			
Parachute streamed	49			
Inadvertent opening of lap belt	50			
Failure of lap belt to open	51			
Unconscious/dazed	54			
Other	98			

		B	D	A
Difficulty reaching hatch/exit - equipment hangup	24			
Pinned down in A/C (other than equipment hangup)	25			
Confusion/panic/disorientation	26			
Darkness - no visual reference	27			
Fire/smoke/fuel	28			
Anthropometric problem	29			
Personal equipment factor (other than hangup)	30			
Man struck canopy/canopy bow	33			
Man struck by other equipment	39			
Seat/parachute entanglement	42			
Man tangled in chute risers - major	43			
Man tangled in chute risers - minor	44			
Inrushing water	52			
Cold	53			
Unconscious/dazed	54			
Other	98			

REMARKS

B. GROUND		B	D	A
Buffeting	01			
G Forces	02			
Seat Pins not removed	04			
Difficulty locating canopy jettison mechanism	05			
Hampered by clothing	06			
Hampered by equipment	07			
Hampered by injuries	08			
Difficulty releasing canopy/hatch	09			
Failure release canopy/hatch	10			
Difficulty locating/reaching normal ejection mechanism	11			
Difficulty locating/reaching alternate ejection mechanism	12			
Face curtain failed to activate seat	13			
Face curtain problem (locating, reaching, etc)	14			
Seat pan firing handle failed to activate seat	15			
Seat pan firing handle problem (locating, etc)	16			
Canopy jettison problem	17			
Canopy jettison failure (automatic means)	18			
Could not open canopy/hatch	19			
Difficulty releasing restraints	20			
Difficulty reaching hatch/exit - obstructions	21			
Difficulty reaching hatch/exit - injuries	22			
Difficulty reaching hatch/exit - A/C attitude	23			
Difficulty reaching hatch/exit - equipment hangup	24			
Pinned down in A/C (other than equip hangup)	25			
Confusion/panic/disorientation	26			
Darkness - no visual reference	27			
Fire/smoke/fuel	28			
Anthropometric problem	29			
Personal equipment factor (other than hangup)	30			
Man struck canopy/canopy bow	33			
Man struck by other equipment	39			
Unconscious/dazed	54			
Other	98			

C. WATER		B	D	A
Buffeting	01			
Seat pins not removed	04			
Difficulty locating canopy jettison mechanism	05			
Hampered by clothing	06			
Hampered by equipment	07			
Hampered by injuries	08			
Difficulty releasing canopy/hatch	09			
Failure to release canopy/hatch	10			
Difficulty locating/reaching normal ejection mechanism	11			
Difficulty locating/reaching alternate ejection mechanism	12			
Face curtain failed to activate seat	13			
Face curtain problem (locating, reaching, etc.)	14			
Seat pan firing handle failed to activate seat	15			
Seat pan firing handle problem (locating, etc.)	16			
Canopy jettison problem	17			
Canopy jettison failure (automatic means)	18			
Could not open canopy/hatch	19			
Difficulty releasing restraints	20			
Difficulty reaching hatch/exit - obstructions	21			
Difficulty reaching hatch/exit - injuries	22			
Difficulty reaching hatch/exit - A/C attitude	23			

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## EJECTION OR BAILOUT (Complete for all inflight escapes and ejections)

## TIME FROM EMERGENCY UNTIL ESCAPE ATTEMPT WAS INITIATED

Hours \_\_\_\_\_ Minutes \_\_\_\_\_ Seconds \_\_\_\_\_

## DELAY IN INITIATING ESCAPE DUE TO:

- |                                    |                          |                     |                          |
|------------------------------------|--------------------------|---------------------|--------------------------|
| 1 - Attempting to overcome problem | <input type="checkbox"/> | 5 - Losing altitude | <input type="checkbox"/> |
| 2 - Avoiding populated area        | <input type="checkbox"/> | 6 - Losing airspeed | <input type="checkbox"/> |
| 3 - Avoiding unsuitable terrain    | <input type="checkbox"/> | 8 - Other           | <input type="checkbox"/> |
| 4 - Gaining altitude               | <input type="checkbox"/> | 9 - Unknown         | <input type="checkbox"/> |

## TERRAIN CLEARANCE AT TIME OF:

- A. 1 - Escape (feet) \_\_\_\_\_  
2 - Parachute opening (feet) \_\_\_\_\_

- B. 1 - Airspeed at time of escape \_\_\_\_\_ KIAS  
2 - Ground/forward speed (if not airborne) \_\_\_\_\_ K

- C. 1 - Parachute did not open ☐  
2 - Parachute streamed ☐

## PROTECTIVE HELMET:

Time	Chin strap fastened			Helmet visor lowered		
	1	0	9	1	0	9

Before emergency \_\_\_\_\_ Yes ☐ No ☐ Unk ☐ Yes ☐ No ☐ Unk ☐During egress \_\_\_\_\_ Yes ☐ No ☐ Unk ☐ Yes ☐ No ☐ Unk ☐During chute ldg. \_\_\_\_\_ Yes ☐ No ☐ Unk ☐ Yes ☐ No ☐ Unk ☐Chin strap fastened snugly: \_\_\_\_\_ Yes ☐ No ☐ Unk ☐Nape strap fastened snugly: \_\_\_\_\_ Yes ☐ No ☐ Unk ☐

## ZERO LANYARD:

- | A. When connected                                     | B. SURVIVAL FACTOR  |
|---|---|
| 0 - Available, not connected <input type="checkbox"/> | 0 - Not a factor in survival <input type="checkbox"/>     |
| 1 - Prior to emergency <input type="checkbox"/>       | 1 - Factor in survival <input type="checkbox"/>           |
| 2 - During emergency <input type="checkbox"/>         | 2 - Not a factor in non-survival <input type="checkbox"/> |
| 3 - Time unknown <input type="checkbox"/>             | 3 - Factor in non-survival <input type="checkbox"/>       |
| 8 - NA not available <input type="checkbox"/>         | 9 - Unknown if factor <input type="checkbox"/>            |
| 9 - Unknown <input type="checkbox"/>                  |   |

## AUTOMATIC LAP BELT RELEASE

- 0 - Did not open or release ☐
- 1 - Released automatically as designed ☐
- 2 - Opened manually ☐
- 3 - Opened inadvertently ☐
- 8 - Unknown how released ☐
- 9 - Unknown if released ☐

## REMOVAL OF AIRCRAFT CANOPY

- | A. Intent  | D. Method   |
|--|---|
| 1 - Intentional <input type="checkbox"/>                 | 1 - Arm rest/leg brace <input type="checkbox"/>     |
| 2 - Unintentional, self-induced <input type="checkbox"/> | 2 - Face curtain <input type="checkbox"/>           |
| 3 - Unintentional, mechanical <input type="checkbox"/>   | 3 - Seat pan handle <input type="checkbox"/>        |
| 9 - Unknown <input type="checkbox"/>                     | 4 - Manually unlocked <input type="checkbox"/>      |
|  | 5 - External force <input type="checkbox"/>         |
| B. Initiated by  | 6 - Canopy jettison handle <input type="checkbox"/> |
| 1 - This individual <input type="checkbox"/>             | 9 - Unknown <input type="checkbox"/>                |
| 2 - Another individual <input type="checkbox"/>          | 8 - Other (describe) <input type="checkbox"/>       |
| 9 - Unknown <input type="checkbox"/>                     |   |
| C. Removal   |   |
| 0 - Definitely not attempted <input type="checkbox"/>    |   |
| 1 - Accomplished <input type="checkbox"/>                |   |
| 2 - Attempted (unsuccessful) <input type="checkbox"/>    |   |
| 3 - Unknown if attempted <input type="checkbox"/>        |   |

## EJECTION

- | A. Intent                                   | C. Method   |
|---|---|
| 1 - Intentional <input type="checkbox"/>    | 1 - Arm rest/leg brace <input type="checkbox"/>   |
| 2 - Unintentional <input type="checkbox"/>  | 2 - Face curtain <input type="checkbox"/>         |
| 9 - Unknown <input type="checkbox"/>        | 3 - Seat pan handle <input type="checkbox"/>      |
|   | 4 - Seat sequencer <input type="checkbox"/>       |
| B. Initiated by                             | 5 - Impact <input type="checkbox"/>               |
| 1 - This person <input type="checkbox"/>    | 6 - Fire <input type="checkbox"/>                 |
| 2 - Another person <input type="checkbox"/> | 7 - Mechanical failure <input type="checkbox"/>   |
| 3 - External force <input type="checkbox"/> | 8 - Other external force <input type="checkbox"/> |
| 9 - Unknown <input type="checkbox"/>        | 9 - Unknown <input type="checkbox"/>              |

## BODY POSITION AT EJECTION (as compared to optimal)

	Head	Hips	Feet	Elbows
Optimal 1				
Forward 2				
Upward 3				
Lateral 4				
Unknown 9				

## 10. POSITION OF EJECTION SEAT

- |  |  |
|--|--|
| 1 - Full up <input type="checkbox"/>   | 3 - Intermediate position <input type="checkbox"/> |
| 2 - Full down <input type="checkbox"/> | 9 - Unknown <input type="checkbox"/>               |

## 11. METHOD OF SEPARATING MAN FROM SEAT

- |   |  |
|---|--|
| 0 - Did not separate <input type="checkbox"/>     | 4 - Personnel parachute <input type="checkbox"/> |
| 1 - Seat separator <input type="checkbox"/>       | 8 - Other <input type="checkbox"/>               |
| 2 - Spontaneous/tumbling <input type="checkbox"/> | 9 - Unknown <input type="checkbox"/>             |
| 3 - Pushed self away <input type="checkbox"/>     |  |

## 12. TYPE OF SEAT SEPARATOR

- |                                      |   |
|--------------------------------------|---|
| 0 - None <input type="checkbox"/>    | 3 - Parachute <input type="checkbox"/>        |
| 1 - Rotary <input type="checkbox"/>  | 4 - Snubbing lanyard <input type="checkbox"/> |
| 2 - Bladder <input type="checkbox"/> |   |

## 13. METHODS OF DEPLOYING PARACHUTE

- |   |  |
|---|--|
| 0 - Not deployed <input type="checkbox"/>     | 5 - Static line <input type="checkbox"/> |
| 1 - Automatic timer <input type="checkbox"/>  | 6 - Manually <input type="checkbox"/>    |
| 2 - Aneroid <input type="checkbox"/>          | 8 - Other <input type="checkbox"/>       |
| 3 - Ballistic device <input type="checkbox"/> | 9 - Unknown <input type="checkbox"/>     |
| 4 - Zero lanyard <input type="checkbox"/>     |  |

## 14. PARACHUTE OPENING SHOCK

- |   |                                      |
|---|--------------------------------------|
| 0 - Negligible <input type="checkbox"/> | 2 - Severe <input type="checkbox"/>  |
| 1 - Moderate <input type="checkbox"/>   | 9 - Unknown <input type="checkbox"/> |

## 15. OSCILLATIONS

- |                   | 0 - Negligible | 1 - Moderate | 2 - Severe | 9 - Unknown |
|-------------------|----------------|--------------|------------|-------------|
| A. During descent |                |              |            |             |
| B. During landing |                |              |            |             |

## 16. PARACHUTE DAMAGE - Give number of:

- |                            |                          |
|----------------------------|--------------------------|
| Severed shroud lines _____ | Torn panels, major _____ |
| Missing panels _____       | Torn panels, minor _____ |

## 17. CAUSE OF PARACHUTE DAMAGE

- |  |   |
|--|---|
| 1 - Opening shock <input type="checkbox"/>           | 6 - In trees <input type="checkbox"/>         |
| 2 - Fouled on ejection seat <input type="checkbox"/> | 7 - Dragging <input type="checkbox"/>         |
| 3 - Fouled on A/C <input type="checkbox"/>           | 8 - Other (describe) <input type="checkbox"/> |
| 4 - Fire <input type="checkbox"/>                    | 9 - Unknown <input type="checkbox"/>          |
| 5 - On landing <input type="checkbox"/>              |   |

## 18. FOUR LINE CUT

- |                            | 1-Yes | 0-No | 8-Partly | 9-Unk |
|----------------------------|-------|------|----------|-------|
| Attempted _____            |       |      |          |       |
| Succeeded _____            |       |      |          |       |
| Stopped Oscillations _____ |       |      |          |       |
| Slowed Descent _____       |       |      |          |       |
| Provided Steering _____    |       |      |          |       |

## 19. DIRECTION FACED AT CHUTE LANDING

- |   |  |
|---|--|
| 1 - Directly facing <input type="checkbox"/>    | 4 - Quartering, back <input type="checkbox"/>  |
| 2 - Facing away <input type="checkbox"/>        | 5 - Directly sideways <input type="checkbox"/> |
| 3 - Quartering, facing <input type="checkbox"/> | 9 - Unknown <input type="checkbox"/>           |

## 20. LANDING CONDITIONS

- A. Total weight under parachute: \_\_\_\_\_ lbs
- B. Surface wind: \_\_\_\_\_ knots
- C. Dragged by chute
- 1 - yes ☐
- 0 - no ☐
- D. Distance dragged: \_\_\_\_\_ yards

## 21. PARACHUTE LANDING POSITION TECHNIQUES

- |  |  |
|--|--|
| A. 0 - Could not see <input type="checkbox"/>  | C. 1 - Muscles tensed <input type="checkbox"/>     |
| 1 - Looking ahead <input type="checkbox"/>     | 2 - Muscles too tense <input type="checkbox"/>     |
| 2 - Looking down <input type="checkbox"/>      | 3 - Too relaxed <input type="checkbox"/>           |
| 8 - Other <input type="checkbox"/>             | 8 - Other <input type="checkbox"/>                 |
| 9 - Unknown <input type="checkbox"/>           | 9 - Unknown <input type="checkbox"/>               |
| B. 1 - Fell obliquely <input type="checkbox"/> | D. 1 - Proper position <input type="checkbox"/>    |
| 2 - Fell backward <input type="checkbox"/>     | 2 - Knees locked <input type="checkbox"/>          |
| 3 - Fell forward <input type="checkbox"/>      | 3 - Arms in poor position <input type="checkbox"/> |
| 8 - Other <input type="checkbox"/>             | 8 - Other <input type="checkbox"/>                 |
| 9 - Unknown <input type="checkbox"/>           | 9 - Unknown <input type="checkbox"/>               |

## 22. DEPLOYED BEFORE LANDING

- |                 | 1 - yes | 0 - no | 9 - unknown |
|-----------------|---------|--------|-------------|
| A. Survival kit |         |        |             |
| B. Life raft    |         |        |             |
| C. Life vest    |         |        |             |

## 23. CANOPY DEFLATION POCKETS

- 0 - Not effective in collapsing chute ☐
- 1 - Aided in collapsing chute ☐
- 7 - Not installed ☐
- 8 - Unknown if installed ☐
- 9 - Unknown if effective ☐

ME \_\_\_\_\_ SERIAL NO. \_\_\_\_\_

A/C \_\_\_\_\_

BUNO \_\_\_\_\_

VIII

## SURVIVAL AND RESCUE

## 1. SURVIVAL TRAINING

\* Use code at right to indicate the role  
this person's training played in survival

0 - Not a factor  
1 - Definitely helped  
2 - Possibly helped

3 - Lack of training definite factor  
4 - Lack of training possible factor  
9 - Role unknown

Type Training	Course and Sponsor	Place Accomplished	Completed		*Role
			Mo.	Year	
Water Survival:					
Maintenance swim					
Dilbert Dunker					
Parachute drag					
Immersed cockpit					
Immersed seat					
Jungle Survival					
Arctic Survival					
Desert Survival					
Mountain Survival					
Survival (General)					

## 2. CONDITIONS PREVAILING AT SURVIVAL/RESCUE SITE. IF WIDELY VARIABLE, GIVE RANGE.

G. Weather:

A. Water temperature \_\_\_\_\_ °F. F. - Terrain: 5 - Water ☐  
B. Air temperature \_\_\_\_\_ °F. 1 - Open ground ☐ 6 - Ice/Snow ☐  
C. Surface winds \_\_\_\_\_ Knots 2 - Woods/jungle ☐ 7 - Swamp ☐  
D. Wave height \_\_\_\_\_ Feet 3 - Mountains ☐ 8 - Other ☐  
E. Wave frequency \_\_\_\_\_ per min. 4 - Desert ☐ 9 - Unknown ☐ 5 - Snow ☐  
1 - Clear ☐ 6 - Sleet ☐  
2 - Overcast ☐ 7 - Hail ☐  
3 - Fog ☐ 8 - Other ☐  
4 - Rain ☐ 9 - Unknown ☐

## 3. TIME LAPSE SEQUENCE FOR RESCUE EVENTS (Give time lapse in hours and minutes from time of mishap)

For actual rescue vehicle and personnel and others who took an active part in the rescue sequence  
but did not actually recover this individual. See Instructions for details.

	Actual Rescuer	Other Participant	Other Participant	Light Conditions			
				Day	Night	Dawn	Dusk
A. Rescue personnel notified that mishap had occurred							
B. Rescue vehicle departed							
C. This individual located by rescue personnel							
D. This individual physically reached by rescue vehicle/personnel							
E. This individual actually aboard rescue vehicle or rescue attempt abandoned							
F. Rescue completed (person returned to station, hospital, etc.)							

4. A. Time this individual spent in water: \_\_\_\_\_ hrs. \_\_\_\_\_ min.

B. Time this individual spent in life raft: \_\_\_\_\_ hrs. \_\_\_\_\_ min.

5. At time of rescue alert, distance in miles from mishap site to:

A. Actual rescue vehicle \_\_\_\_\_ B. Nearest rescue vehicle \_\_\_\_\_

## 6. PERSONNEL/VEHICLES PARTICIPATING IN RESCUE

A. Vehicle performing actual pickup of this person

Type/Model: \_\_\_\_\_

Location when alerted: \_\_\_\_\_

Duty when alerted: \_\_\_\_\_

B. Did rescue personnel leave vehicle to assist in rescue?

1 - Yes ☐ 0 - No ☐ 9 - Unknown ☐

If so, how?

A - Parachuted ☐B - Jumped without parachute ☐C - Descended line/ladder/net ☐D - Lowered by hoist ☐E - Normal ground/water ☐Y - Other ☐

C. List other vehicles participating in rescue effort:

2nd vehicle in Item 3. \_\_\_\_\_

3rd vehicle in Item 3. \_\_\_\_\_

Others who stood by ready to render assistance if required:

D. Number search and rescue hours \_\_\_\_\_

## 9. ALERTING/COMMUNICATIONS PROBLEMS

A - Poor radio reception ☐B - Telephone line busy ☐C - Poor radio discipline ☐D - Aircraft radio/IFF equipment inoperative ☐E - Poor radio procedures ☐Y - Other ☐

## 10. DELAYS IN DEPARTURE OF RESCUE VEHICLES

A - Vehicle operator not available ☐B - Vehicle not ready ☐C - Vehicle crew not available ☐D - Communications breakdown ☐E - Completing previously assigned duties ☐F - Lack of information on crash site ☐G - Nature of terrain ☐H - Weather ☐Y - Other ☐

## 11. RESCUE VEHICLE PROBLEMS ENROUTE

A - Headwind ☐B - Poor visibility ☐C - High sea state ☐D - Mechanical problems ☐E - Nature of terrain ☐F - Other obstructions (fences, etc.) ☐G - Rescuers lost ☐H - Weather ☐Y - Other ☐

## 12. PROBLEMS IN LOCATING INDIVIDUAL (or keeping in sight)

A - Heavy seas ☐B - Trees ☐C - Fog/clouds ☐D - Precipitation ☐E - Darkness ☐F - Radio interference ☐G - Confusion due to other lights ☐H - Malfunction of directional equipment ☐J - Lack of correct information on location of survivor ☐K - Inability to visually distinguish survivor from terrain ☐L - Loss of radio/radar contact ☐M - Survivor's failure to use signalling equipment ☐Y - Other ☐

## 8. RESCUE ALERTING MEANS - (Use numbers to show sequence)

A - Witnessed ☐ H - Radio survival type ☐B - Radar surveillance ☐ J - Other radio report ☐C - Overdue report to SAR ☐ K - Visual signalling equipment ☐D - Airborne rapid relay ☐ L - Audio signalling equipment ☐E - Crash phone ☐ M - Survivor report ☐F - Other telephone ☐ N - Loss of radio contact ☐G - Radio May-day call ☐ P - Smoke/fire-crash scene ☐

Y - Other (describe) \_\_\_\_\_

Other \_\_\_\_\_

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## General

## Pyrotechnics

## Ballistics

## Auditory

## Visual

## 14. SURVIVAL PROBLEMS ENCOUNTERED BY THIS PERSON

- |                                  |                          |  |                          |  |                          |
|----------------------------------|--------------------------|--|--------------------------|--|--------------------------|
| 01 -Inadequate flotation gear    | <input type="checkbox"/> | 09 -Pulled down by sinking parachute     | <input type="checkbox"/> | 18- Topography (swamps,mountains, deserts, etc.) | <input type="checkbox"/> |
| 02 -Inadequate cold weather gear | <input type="checkbox"/> | 10 -Entanglement (other than parachute)  | <input type="checkbox"/> | 19 -Darkness                                     | <input type="checkbox"/> |
| 03 -Lack of signalling equipment | <input type="checkbox"/> | 11 -Unfamiliar with procedures/equipment | <input type="checkbox"/> | 20 -Thrown out of raft                           | <input type="checkbox"/> |
| 04 -Lack of other equipment      | <input type="checkbox"/> | 12 -Confused, dazed, disoriented         | <input type="checkbox"/> | 21 -Hampered by helo downwash                    | <input type="checkbox"/> |
| 05 -Entanglement (parachute)     | <input type="checkbox"/> | 13 -Incapacitated by injury              | <input type="checkbox"/> | 22 - Problem boarding rescue vehicle             | <input type="checkbox"/> |
| 06 -Dragging (parachute)         | <input type="checkbox"/> | 14 -Poor physical condition              | <input type="checkbox"/> | 23 -Thirst                                       | <input type="checkbox"/> |
| 07 -Parachute hardware problem   | <input type="checkbox"/> | 15 -Exposure (heat, cold, sunburn, etc.) | <input type="checkbox"/> | 24 -Hunger                                       | <input type="checkbox"/> |
| 08 -Entrapment in aircraft       | <input type="checkbox"/> | 16 -Fatigue                              | <input type="checkbox"/> | 25 -Insects, snakes, animals, etc.               | <input type="checkbox"/> |
|                                  |                          | 17 -Weather                              | <input type="checkbox"/> | 26 -Sharks                                       | <input type="checkbox"/> |
| 98 -Other                        |                          |  |                          |  |                          |

## 15. PROBLEMS THAT COMPLICATED RESCUE OPERATIONS

- |  |                          |   |                          |
|--|--------------------------|---|--------------------------|
| #1 - Failure of rescue vehicle (mechanical problems)   | <input type="checkbox"/> | 15 - Panic/inappropriate actions of person being rescued                | <input type="checkbox"/> |
| #2 - Inadequacy/lack of rescue vehicle                 | <input type="checkbox"/> | 16 - Rescue vehicle accident  | <input type="checkbox"/> |
| #3 - Failure of rescue equipment (hoist, etc.)         | <input type="checkbox"/> | 17 - Communications problems  | <input type="checkbox"/> |
| #4 - Inadequacy/lack of rescue equipment               | <input type="checkbox"/> | 18 - Drag/entanglement by deployed parachute                            | <input type="checkbox"/> |
| #5 - Inadequacy of rescue personnel knowledge/training | <input type="checkbox"/> | 19 - Topography (rough seas, mountains, etc.)                           | <input type="checkbox"/> |
| #6 - Inadequate medical equipment                      | <input type="checkbox"/> | 20 - Interference from other vehicles                                   | <input type="checkbox"/> |
| #7 - Inadequate medical facilities                     | <input type="checkbox"/> | 21 - Victim pulled away by extreme forces                               | <input type="checkbox"/> |
| #8 - Vehicle operator factor (poor procedure)          | <input type="checkbox"/> | 22 - Weather  | <input type="checkbox"/> |
| #9 - Rescue crewman assist hesitancy                   | <input type="checkbox"/> | 23 - Darkness   | <input type="checkbox"/> |
| 10 - Fire/explosion                                    | <input type="checkbox"/> | 24 - Weight/drag problem not due to parachute                           | <input type="checkbox"/> |
| 11 - Entrapment in aircraft                            | <input type="checkbox"/> | 25 - Hampered by personal/survival equipment of person being rescued    | <input type="checkbox"/> |
| 12 - Physical limitations of rescue personnel          | <input type="checkbox"/> | 26 - Floating debris  | <input type="checkbox"/> |
| 13 - Physical limitations of person being rescued      | <input type="checkbox"/> | 27 - Primary rescuer delayed awaiting futile attempts by other rescuers | <input type="checkbox"/> |
| 14 - Carelessness by rescue personnel                  | <input type="checkbox"/> | 28 - Hampered by helicopter downwash                                    | <input type="checkbox"/> |
| 98 - Other (specify) _____                             |                          |   |                          |

## 16. INDIVIDUALS PHYSICAL CONDITION

16. INDIVIDUALS PHYSICAL CONDITION	During Rescue	After Rescue
Fully able to assist	1 -	A-
Partially able to assist	2 -	B-
Immobile or unconscious	3 -	C-
Fatal on recovery-due to injuries		D-
Fatal on recovery-drowned		E-
Recovered alive-died from injuries		F-
Lost during rescue attempt-presumed drowned		G-
Lost during rescue attempt-apparently injured fatally or drowned		H-

## 17. CHECK CATEGORIES OF FACTORS THAT HELPED RESCUE/RECOVERY

- |   |                          |                                  |                              |
|---|--------------------------|----------------------------------|------------------------------|
| 1 - Rescue personnel training             | <input type="checkbox"/> | Availability of rescue equipment | 6 - <input type="checkbox"/> |
| 2 - Training of person to be rescued      | <input type="checkbox"/> | Suitability of rescue equipment  | 7 - <input type="checkbox"/> |
| 3 - Aircraft emergency escape means       | <input type="checkbox"/> | Survivor's techniques            | 8 - <input type="checkbox"/> |
| 4 - Personal equipment releases/actuators | <input type="checkbox"/> | Coordination of rescue efforts   | 9 - <input type="checkbox"/> |
| 5 - Rescue procedures/pre-accident plans  | <input type="checkbox"/> |                                  |                              |

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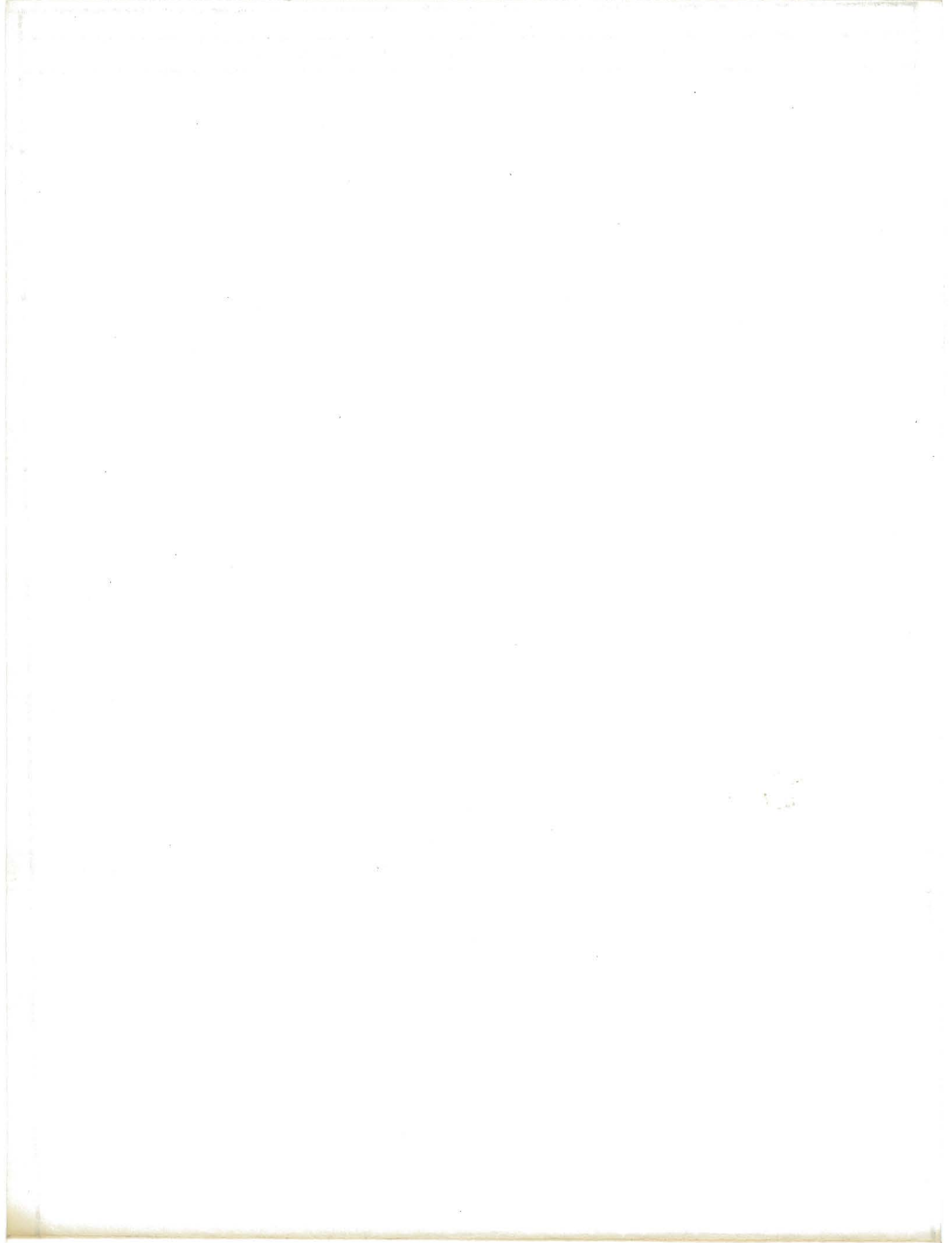
A/C

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IX

FLIGHT SURGEON'S COMMENTS, ANALYSIS AND RECOMMENDATIONS

Flight Surgeon participated fully in investigation Yes <input type="checkbox"/> No <input type="checkbox"/>		Number of hours spent _____	Date of Report _____
Flight Surgeon participated fully in Board proceedings Yes <input type="checkbox"/> No <input type="checkbox"/>		Number of hours spent _____	No. Reports prepared _____
Flight Surgeon's Name and Grade _____		Duty Station _____	Signature _____
Name of Individual _____			Service No. _____



## MEDICAL INFORMATION

6. INJURIES INCURRED DURING MISHAP. Use standard DOD terminology for Body Part, Diagnosis and Cause of Injury

Leave these columns blank

7. LABORATORY TESTS	TISSUE TESTED	METHOD USED	LABORATORY DOING TEST	RESULT
Carbon monoxide				
Alcohol				
Lactic acid				
Other (Specify)				

9. DISEASES/ DEFECTS present at the time of the Mishap	Method of Discovery				Waivers (as applicable)	
	Annual Physical	Sick Call	Autopsy	Other	Authority	Date
DIAGNOSES						

12. List additional injuries received as a result of the mishap, and add any pertinent remarks:

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**MEDICAL OFFICER'S REPORT OF A/C ACCIDENT, INCIDENT, OR GROUND ACCIDENT**

**IDENTIFICATION**

1. FROM (Name and mailing address of activity)				2. MOR NUMBER		3. DAMAGE CODE	
4. TYPE OF MISHAP Ground <input type="checkbox"/> Accident <input type="checkbox"/> Accident <input type="checkbox"/> Incident		5. NO. OF OCCUPANTS		6. DATE		7. MODEL A/C	
8. BUNO		9. MODEL OTHER A/C IF INVOLVED		10. BUNO		11. NO. OF OCCUPANTS	
12. DAMAGE CODE		13. INDIVIDUALS INVOLVED (Use additional sheets if required) NAME (Last, first and middle initial)		14. RANK/ RATE		15. BRANCH OF SERVICE	
16. DUTY BILLET		17. DIRECTION FACING AT TIME OF MISHAP		18. LOCATION AT TIME OF MISHAP		19. INJURY CODE	
20. DISPO- SITION		A.		B.		C.	
D.							

21. NARRATIVE ACCOUNT OF MISHAP (Use additional 8 x 10-1/2 sheets if required)

<b>I</b>				<b>FLIGHT DATA</b>			
1. Terrain clearance at time of emergency _____ feet				7. Cloud Conditions			
2. Cabin altitude at time of emergency _____ feet				3 - In clouds _____ <input type="checkbox"/>			
3. Time at cabin altitude _____ hours _____ min.				0 - Clear _____ <input type="checkbox"/>			
4. Ambient altitude at time of emergency _____ min.				4 - In and out of clouds _____ <input type="checkbox"/>			
5. Time at ambient altitude _____ hours _____ feet				1 - Overcast _____ <input type="checkbox"/>			
6. Place in Formation				2 - Undercast _____ <input type="checkbox"/>			
A - Single aircraft <input type="checkbox"/> Y - Other (specify) _____				8. Horizon			
L - Lead <input type="checkbox"/> _____				1 - Distinct <input type="checkbox"/> 8 - Other (specify) _____			
W - Wing <input type="checkbox"/> _____				2 - Obscured <input type="checkbox"/> _____			
				9. Duration of Flight: _____ hours _____ min.			
NAME		SERIAL NO.		A/C		BUNO	
_____		_____		_____		_____	

## III

## PSYCHOPHYSIOLOGICAL AND ENVIRONMENTAL FACTORS

INSTRUCTIONS: Complete on all occupants of aircraft, all injured persons, and all persons possibly contributing to the cause of the mishap. Supervisory factors attributed to persons not in the aircraft and such factors as design or weather should be reported only for the person in primary control of the aircraft. Factors contributing to injury during mid-air collisions, crash landings, ditchings, etc., are to be considered part of survival phase. Use codes at right to show only those factors present or contributing in each phase.

## PHASES OF MISHAP

A - Accident  
E - Escape  
S - Survival (includes parachute landings)  
R - Rescue

## FACTOR IMPORTANCE

D - Definitely contributed  
S - Suspected factor  
P - Condition PRESENT, but did not contribute to accident or injury

FACTORS		A	E	S	R	FACTORS		A	E	S	R					
<b>1. SUPERVISORY FACTORS</b>						Visual illusions						613				
Inadequate briefing	101					Unconsciousness						614				
Ordered/led on flight beyond capability	102					Disorientation/vertigo						615				
Poor crew coordination	103					Hypoxia						616				
Other (specify)	199					Hyperventilation						617				
						Dysbarism						618				
<b>2. PRE-FLIGHT FACTORS</b>						Carbon Monoxide poisoning						619				
Faulty flight plan	201					Boredom						620				
Faulty pre-flight of aircraft	202					Inattention						621				
Faulty preparation of personal equipment	203					Channelized attention						622				
Hurried departure	204					Distraction						623				
Delayed departure	205					Preoccupation with personal problems						624				
Inadequate weather analysis	206					Excessive motivation to succeed						625				
Other (specify)	299					Overconfidence						626				
						Lack of self-confidence						627				
<b>3. EXPERIENCE/TRAINING FACTORS</b>						Lack of confidence in equipment						628				
Inadequate transition	301					Apprehension						629				
Limited total experience	302					Panic						630				
Limited recent experience	303					Other (Specify)						699				
Failure to use accepted procedures	304															
Other (Specify)	399					<b>7. ENVIRONMENTAL FACTORS</b>										
						Acceleration forces, in-flight						701				
<b>4. DESIGN FACTORS</b>						Acceleration forces, impact						702				
Design of instruments, controls	401					Decompression						703				
Location of instruments, controls	402					Vibration						704				
Failure of instruments, controls	403					Glare						705				
Cockpit lighting	404					Smoke, fumes, etc.						706				
Runway lighting	405					Heat						707				
Lighting of other aircraft	406					Cold						708				
Personal equipment interference	407					Wind blast						709				
Workspace incompatible with man	408					Visibility restriction-weather, haze, darkness						710				
Other (Specify)	499					Visibility restriction-icing, windows fogged, etc.						711				
						Visibility restriction-dust, smoke, etc., in acft						712				
<b>5. COMMUNICATIONS PROBLEMS</b>						Weather, other than visibility restriction						713				
Misinterpreted communications	501					Other (Specify)						799				
Disrupted communications	502															
Language barrier	503					<b>8. OTHER FACTORS TO BE CONSIDERED</b>										
Noise interference	504					Habit interference, used wrong control						801				
Other (specify)	599					Confusion of controls, other						802				
						Misread instrument (s)						803				
<b>6. PSYCHOPHYSIOLOGICAL FACTORS</b>						Misinterpreted instrument reading						804				
Food poisoning	601					Misled by faulty instrument						805				
Motion sickness	602					Visual restriction by equip structures						806				
Other acute illness	603					Task oversaturation						807				
Other pre-existing disease/defect	604					Inadequate coordination or timing						808				
Get-homeitis	605					Misjudged speed or distance						809				
Hangover	606					Selected wrong course of action						810				
Sleep deprivation	607					Delay in taking necessary action						811				
Fatigue, other	608					Violation of flight discipline						812				
Missed meals	609					Navigational error						813				
Drugs prescribed by medical officer	610					Inadvertent operation self-induced						814				
Drugs, other	611					Inadvertent operation mechanically induced						815				
Alcohol	612					Other (Specify)						899				

NAME

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IV

PERSONAL DATA

1. Role of this individual in the cause of the mishap:

A. Primary	B. Contributing	0 - None	9 - Unknown
1 - Definite <input type="checkbox"/> 2 - Probable <input type="checkbox"/> 3 - Possible <input type="checkbox"/>	4 - Definite <input type="checkbox"/> 5 - Probable <input type="checkbox"/> 6 - Possible <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. BACKGROUND DATA (Complete for ALL pilots and others who possibly contributed to Mishap)

A. Date last leave ended _____	D. Date of last previous flight _____	K. Hours slept in last 24 hours _____
B. Days duration last leave _____	E. Hours flown in last 24 hours _____	L. Hours slept in last 48 hours _____
C. Type of last leave taken	F. Hours flown in last 48 hours _____	M. Hours continuous duty prior to mishap _____
1. Ordinary <input type="checkbox"/>	G. Missions flown in last 24 hours _____	N. Hours continuously awake prior to mishap _____
2. Emergency <input type="checkbox"/>	H. Missions flown in last 48 hours _____	O. Hours duration of last sleep period _____
3. Reenlistment <input type="checkbox"/>	I. Hours worked in last 24 hours _____	P. Time in cockpit prior to flight: _____
4. Graduation <input type="checkbox"/>	J. Hours worked in last 48 hours _____	_____Hours _____Minutes
5. Sick or convalescent <input type="checkbox"/>		
6. Delay enroute <input type="checkbox"/>		
9. Unknown <input type="checkbox"/>		

3. Physiological, Low Pressure Chamber and Vertigo Training (For All Personnel)

Type Training Accomplished	Place Training Accomplished	Completed		Role * in Mishap	
		Month	Year		
					* For Role in Mishap, Use Following Code: 0 = No Importance 1 = Training definitely helped 2 = Training possibly helped 3 = Lack of training definitely a factor 4 = Lack of training possibly a factor 9 = Unknown

4. Anthropometric Data (e through i for Navy only)

a. Date of Birth: Day _____ Mo. _____ Year _____	e. Trunk Height _____ inches
b. Height _____ inches	f. Functional Reach _____ inches
c. Weight _____ pounds	g. Buttock - Knee Length _____ inches
d. Sitting Height _____ inches	h. Leg Length _____ inches
	i. Shoulder Width (bideitoid) _____ inches

5. Number and type of prior mishaps (complete for all Pilots, Co-pilots, and/or Other Persons in Control of Aircraft)  
a. No. \_\_\_\_\_ b. Describe Type(s): \_\_\_\_\_

6. Total Years of Formal Education: \_\_\_\_\_

7. Chronological Account of Activities of Previous 72 hours. (For all Pilots, Co-pilots, and/or Persons possibly contributing to mishap):

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_____	_____	_____	_____

V

## PERSONAL, SURVIVAL AND ESCAPE EQUIPMENT

[illegible]

ESCAPE - EGRESS Complete for All Individuals

LOCATION IN AIRCRAFT

1 - Cockpit or Pilot's compartment

2 - Navigator's/Engineer's compartment

3 - Passengers' compartment (single deck)

4 - Passengers' compartment (upper deck)

5 - Passengers' compartment (lower deck)

8 - Other compartment

9 - Compartment unknown

Longitudinal Location

1 - Forward section

2 - Center section

3 - Aft section

4 - Section unknown

C.

1 - Forward

2 - Aft

3 - Sideward

9 - Unknown

Lateral Location

2 - Center

4 - Left side

5 - Right side

9 - Unknown

Use of Seat

0 - Not in seat

1 - In seat

2 - Bunk/litter

9 - Unknown

METHOD OF ESCAPE (More than one may apply)

Ejection

1 - Accomplished (free of aircraft)

2 - Attempted (not accomplished)

3 - Seat ejected on impact (terrain)

4 - Inadvertent ejection

7 - Unknown if attempt was made

8 - Suspected ejection

0 - Definitely not attempted

Bailout

1 - Accomplished (free of aircraft)

2 - Attempted (not accomplished)

3 - Bailed out after ejection attempt failed

7 - Unknown if attempt was made

8 - Suspected bailout

0 - Definitely not attempted

Other

A. Standard emergency ground egress

1 - Underwater egress (not ejection)

3 - Did not escape

4 - Exit unassisted (other than stand. emerg. ground egress)

5 - Carried/assisted out

6 - Blown/thrown out

7 - Jumped from a/c (airborne)

8 - Unknown if escape accomplished

9 - Escaped, method unknown

INTENT FOR ESCAPE

1 - Intentional

2 - Unintentional, self-induced

3 - Unintentional, mechanical

4 - Intent unknown

EXIT USED

1 - Normal exit

2 - Ejected through canopy

3 - Emergency exit

8 - Other

9 - Unknown

COCKPIT/CABIN CONDITION AFTER IMPACT

0 - No damage (other than canopy loss, etc.)

1 - Minor damage (definitely habitable)

2 - Reasonably intact (probably habitable)

3 - Major damage (probably not habitable)

4 - Destroyed (definitely not habitable)

9 - Unknown

ORDER OF ESCAPE (1st, 2nd, etc.)

REASON(S) FOR ESCAPE (More than one may apply)

A - Fire/explosion/ smoke

B - Loss of control

C - Engine failure

D - Fuel exhaustion

E - Structural failure

F - Mid-air collision

G - Water impact

H - Ground/structure impact

J - Launch failure

K - Arrestment failure

Y - Other

Z - Unknown

8. COMMUNICATIONS PRIOR TO ESCAPE

1 - Distress signal transmitted

2 - Position fix transmitted

3 - Emergency IFF (Manual)

4 - Emergency IFF (Automatic)

9 - Unknown

0 - None

9. NUMBER OF PREVIOUS:

Ejections

Emergency Bailouts

Other parachute jumps (training, skydiving, etc.)

10. TERRAIN OF PARACHUTE LANDING OR CRASH SITE (More than one may be applicable)

A - Open sea

B - Large lake

C - River

D - Deep water, other

E - Shallow water

F - Deep snow

G - Thick ice

H - Marsh/Swamp/Mud

U - Hard ground

J - Soft ground

K - Building

L - Flight deck

M - Dense woods

N - In trees

T - Through trees

P - Ravine/Steep slope

Q - Rocks

R - In/near fireball

S - Desert

Y - Unknown

Z - Other

11. AIRCRAFT ATTITUDE AT TIME OF ESCAPE (Either in flight or after crash, ditching, etc.)

1 - Nose up

0 - Nose down

1 - Right bank

0 - Left bank

A - Nose down spin

B - Flat spin

C - Oscillating spin

D - Rolling

E - Tumbling

F - Disintegration

G - Inverted

H - Mushing

Z - Unknown

Y - Other (describe)

12. EJECTION SEAT/ PARACHUTE TRAINING (Not required for passengers who had no opportunity to escape)

Type of Training	Total Hours in Training	Date of Last Training	Role*
Lectures/Demonstrations			
Training Films			
Unarmed ejection seat			
Armed seat on tower			
Jump School			
Parasail training			
Other (specify)			

\* Use codes below to indicate role training played in this mishap.

0 - No importance

1 - Training definite help

2 - Training possible help

3 - Lack of training factor

4 - Lack of training possible factor

9 - Training role unknown

13. EGRESS DIFFICULTIES (Place X in Appropriate Column)

B - Before D - During A - After

A. AIR

	B	D	A
Buffeting			
G Forces			
Windblast			
Seat pins not removed			
Difficulty locating canopy jettison mechanism			
Hampered by clothing			
Hampered by equipment			
Hampered by injuries			
Difficulty releasing canopy/hatch			
Failure to release canopy/hatch			
Difficulty locating/reaching normal ejection mechanism			
Difficulty locating/reaching alternate ejection mechanism			
Face curtain failed to activate seat			
Face curtain problem (locating, reaching, etc)			
Seat pan firing handle failed to activate seat			
Seat pan firing handle problem (locating, etc)			
Canopy jettison problem			
Canopy jettison failure (automatic means)			
Could not open canopy/hatch			
Difficulty releasing restraints			
Difficulty reaching hatch/exit-obstructions			
Difficulty reaching hatch/exit-injuries			
Difficulty reaching hatch/exit A/C attitude			
Difficulty reaching hatch/exit equip hangup			

E

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13. EGRESS DIFFICULTIES (CONT'D) (Place X in Appropriate Column) B-Before D-During A-After

A. AIR (Cont'd)		B	D	A
Pinned down in A/C (other than equip hangup)	25			
Confusion/panic/disorientation	26			
Darkness - no visual reference	27			
Fire/smoke/fuel	28			
Anthropometric problem	29			
Personal equipment factor (other than hangup)	30			
Upper extremities hit cockpit structures	31			
Lower extremities hit cockpit structures	32			
Man struck canopy/canopy bow	33			
Struck external surface of aircraft	34			
Flailing - upper extremities	35			
Flailing - lower extremities	36			
Drogue slug swinging at man	37			
Drogue slug struck man	38			
Man struck by other equipment	39			
Man struck by seat	40			
Seat separation difficulty	41			
Seat/parachute entanglement	42			
Man tangled in chute risers - major	43			
Man tangled in chute risers - minor	44			
Parachute line over	45			
Man held on to seat	46			
Tumbling/spinning	47			
Parachute did not open	48			
Parachute streamed	49			
Inadvertent opening of lap belt	50			
Failure of lap belt to open	51			
Unconscious/dazed	54			
Other	98			

B. GROUND		B	D	A
Buffeting	01			
G Forces	02			
Seat Pins not removed	04			
Difficulty locating canopy jettison mechanism	05			
Hampered by clothing	06			
Hampered by equipment	07			
Hampered by injuries	08			
Difficulty releasing canopy/hatch	09			
Failure release canopy/hatch	10			
Difficulty locating/reaching normal ejection mechanism	11			
Difficulty locating/reaching alternate ejection mechanism	12			
Face curtain failed to activate seat	13			
Face curtain problem (locating, reaching, etc)	14			
Seat pan firing handle failed to activate seat	15			
Seat pan firing handle problem (locating, etc)	16			
Canopy jettison problem	17			
Canopy jettison failure (automatic means)	18			
Could not open canopy/hatch	19			
Difficulty releasing restraints	20			
Difficulty reaching hatch/exit - obstructions	21			
Difficulty reaching hatch/exit - injuries	22			
Difficulty reaching hatch/exit - A/C attitude	23			
Difficulty reaching hatch/exit - equipment hangup	24			
Pinned down in A/C (other than equip hangup)	25			
Confusion/panic/disorientation	26			
Darkness - no visual reference	27			
Fire/smoke/fuel	28			
Anthropometric problem	29			
Personal equipment factor (other than hangup)	30			
Man struck canopy/canopy bow	33			
Man struck by other equipment	39			
Unconscious/dazed	54			
Other	98			

C. WATER		B	D	A
Buffeting	01			
Seat pins not removed	04			
Difficulty locating canopy jettison mechanism	05			
Hampered by clothing	06			
Hampered by equipment	07			
Hampered by injuries	08			
Difficulty releasing canopy/hatch	09			
Failure to release canopy/hatch	10			
Difficulty locating/reaching normal ejection mechanism	11			
Difficulty locating/reaching alternate ejection mechanism	12			
Face curtain failed to activate seat	13			
Face curtain problem (locating, reaching, etc.)	14			
Seat pan firing handle failed to activate seat	15			
Seat pan firing handle problem (locating, etc.)	16			
Canopy jettison problem	17			
Canopy jettison failure (automatic means)	18			
Could not open canopy/hatch	19			
Difficulty releasing restraints	20			
Difficulty reaching hatch/exit - obstructions	21			
Difficulty reaching hatch/exit - injuries	22			
Difficulty reaching hatch/exit - A/C attitude	23			

D. AIR		B	D	A
Difficulty reaching hatch/exit - equipment hangup	24			
Pinned down in A/C (other than equipment hangup)	25			
Confusion/panic/disorientation	26			
Darkness - no visual reference	27			
Fire/smoke/fuel	28			
Anthropometric problem	29			
Personal equipment factor (other than hangup)	30			
Man struck canopy/canopy bow	33			
Man struck by other equipment	39			
Seat/parachute entanglement	42			
Man tangled in chute risers - major	43			
Man tangled in chute risers - minor	44			
Inrushing water	52			
Cold	53			
Unconscious/dazed	54			
Other	98			

REMARKS

NAME	SERIAL NO.	A/C	BUNO

## EJECTION OR BAILOUT (Complete for all inflight escapes and ejections)

## TIME FROM EMERGENCY UNTIL ESCAPE ATTEMPT WAS INITIATED

Hours \_\_\_\_\_ Minutes \_\_\_\_\_ Seconds \_\_\_\_\_

## DELAY IN INITIATING ESCAPE DUE TO:

- |                                    |                          |                     |                          |
|------------------------------------|--------------------------|---------------------|--------------------------|
| 1 - Attempting to overcome problem | <input type="checkbox"/> | 5 - Losing altitude | <input type="checkbox"/> |
| 2 - Avoiding populated area        | <input type="checkbox"/> | 6 - Losing airspeed | <input type="checkbox"/> |
| 3 - Avoiding unsuitable terrain    | <input type="checkbox"/> | 8 - Other           | <input type="checkbox"/> |
| 4 - Gaining altitude               | <input type="checkbox"/> | 9 - Unknown         | <input type="checkbox"/> |

## TERRAIN CLEARANCE AT TIME OF:

- A. 1 - Escape (feet) \_\_\_\_\_  
2 - Parachute opening (feet) \_\_\_\_\_
- B. 1 - Airspeed at time of escape \_\_\_\_\_ KIAS  
2 - Ground/forward speed (if not airborne) \_\_\_\_\_ K
- C. 1 - Parachute did not open ☐  
2 - Parachute streamed ☐

## PROTECTIVE HELMET:

Time	Chin strap fastened			Helmet visor lowered		
	1	0	9	1	0	9
Before emergency	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Unk <input type="checkbox"/>	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Unk <input type="checkbox"/>
During egress	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Unk <input type="checkbox"/>	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Unk <input type="checkbox"/>
During chute ldg.	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Unk <input type="checkbox"/>	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Unk <input type="checkbox"/>
Chin strap fastened snugly:				Yes <input type="checkbox"/>	No <input type="checkbox"/>	Unk <input type="checkbox"/>
Nape strap fastened snugly:				Yes <input type="checkbox"/>	No <input type="checkbox"/>	Unk <input type="checkbox"/>

## ZERO LANYARD:

- |   |   |
|---|---|
| A. When connected                                     | B. SURVIVAL FACTOR  |
| 0 - Available, not connected <input type="checkbox"/> | 0 - Not a factor in survival <input type="checkbox"/>     |
| 1 - Prior to emergency <input type="checkbox"/>       | 1 - Factor in survival <input type="checkbox"/>           |
| 2 - During emergency <input type="checkbox"/>         | 2 - Not a factor in non-survival <input type="checkbox"/> |
| 3 - Time unknown <input type="checkbox"/>             | 3 - Factor in non-survival <input type="checkbox"/>       |
| 8 - NA not available <input type="checkbox"/>         | 9 - Unknown if factor <input type="checkbox"/>            |
| 9 - Unknown <input type="checkbox"/>                  |   |

## AUTOMATIC LAP BELT RELEASE

- 0 - Did not open or release ☐
- 1 - Released automatically as designed ☐
- 2 - Opened manually ☐
- 3 - Opened inadvertently ☐
- 8 - Unknown how released ☐
- 9 - Unknown if released ☐

## REMOVAL OF AIRCRAFT CANOPY

- |  |   |
|--|---|
| A. Intent  | D. Method   |
| 1 - Intentional <input type="checkbox"/>                 | 1 - Arm rest/leg brace <input type="checkbox"/>     |
| 2 - Unintentional, self-induced <input type="checkbox"/> | 2 - Face curtain <input type="checkbox"/>           |
| 3 - Unintentional, mechanical <input type="checkbox"/>   | 3 - Seat pan handle <input type="checkbox"/>        |
| 9 - Unknown <input type="checkbox"/>                     | 4 - Manually unlocked <input type="checkbox"/>      |
| B. Initiated by  | 5 - External force <input type="checkbox"/>         |
| 1 - This individual <input type="checkbox"/>             | 6 - Canopy jettison handle <input type="checkbox"/> |
| 2 - Another individual <input type="checkbox"/>          | 9 - Unknown <input type="checkbox"/>                |
| 9 - Unknown <input type="checkbox"/>                     | 8 - Other (describe) <input type="checkbox"/>       |
| C. Removal   |   |
| 0 - Definitely not attempted <input type="checkbox"/>    |   |
| 1 - Accomplished <input type="checkbox"/>                |   |
| 2 - Attempted (unsuccessful) <input type="checkbox"/>    |   |
| 3 - Unknown if attempted <input type="checkbox"/>        |   |

## EJECTION

- |   |   |
|---|---|
| A. Intent                                   | C. Method   |
| 1 - Intentional <input type="checkbox"/>    | 1 - Arm rest/leg brace <input type="checkbox"/>   |
| 2 - Unintentional <input type="checkbox"/>  | 2 - Face curtain <input type="checkbox"/>         |
| 9 - Unknown <input type="checkbox"/>        | 3 - Seat pan handle <input type="checkbox"/>      |
| B. Initiated by                             | 4 - Seat sequencer <input type="checkbox"/>       |
| 1 - This person <input type="checkbox"/>    | 5 - Impact <input type="checkbox"/>               |
| 2 - Another person <input type="checkbox"/> | 6 - Fire <input type="checkbox"/>                 |
| 3 - External force <input type="checkbox"/> | 7 - Mechanical failure <input type="checkbox"/>   |
| 9 - Unknown <input type="checkbox"/>        | 8 - Other external force <input type="checkbox"/> |
|   | 9 - Unknown <input type="checkbox"/>              |

## BODY POSITION AT EJECTION (as compared to optimal)

	Head	Hips	Feet	Elbows
Optimal 1				
Forward 2				
Upward 3				
Lateral 4				
Unknown 9				

## 10. POSITION OF EJECTION SEAT

- |  |  |
|--|--|
| 1 - Full up <input type="checkbox"/>   | 3 - Intermediate position <input type="checkbox"/> |
| 2 - Full down <input type="checkbox"/> | 9 - Unknown <input type="checkbox"/>               |

## 11. METHOD OF SEPARATING MAN FROM SEAT

- |   |  |
|---|--|
| 0 - Did not separate <input type="checkbox"/>     | 4 - Personnel parachute <input type="checkbox"/> |
| 1 - Seat separator <input type="checkbox"/>       | 8 - Other <input type="checkbox"/>               |
| 2 - Spontaneous/tumbling <input type="checkbox"/> | 9 - Unknown <input type="checkbox"/>             |
| 3 - Pushed self away <input type="checkbox"/>     |  |

## 12. TYPE OF SEAT SEPARATOR

- |                                      |   |
|--------------------------------------|---|
| 0 - None <input type="checkbox"/>    | 3 - Parachute <input type="checkbox"/>        |
| 1 - Rotary <input type="checkbox"/>  | 4 - Snubbing lanyard <input type="checkbox"/> |
| 2 - Bladder <input type="checkbox"/> |   |

## 13. METHODS OF DEPLOYING PARACHUTE

- |   |  |
|---|--|
| 0 - Not deployed <input type="checkbox"/>     | 5 - Static line <input type="checkbox"/> |
| 1 - Automatic timer <input type="checkbox"/>  | 6 - Manually <input type="checkbox"/>    |
| 2 - Aneroid <input type="checkbox"/>          | 8 - Other <input type="checkbox"/>       |
| 3 - Ballistic device <input type="checkbox"/> | 9 - Unknown <input type="checkbox"/>     |
| 4 - Zero lanyard <input type="checkbox"/>     |  |

## 14. PARACHUTE OPENING SHOCK

- |   |                                      |
|---|--------------------------------------|
| 0 - Negligible <input type="checkbox"/> | 2 - Severe <input type="checkbox"/>  |
| 1 - Moderate <input type="checkbox"/>   | 9 - Unknown <input type="checkbox"/> |

## 15. OSCILLATIONS

0 - Negligible 1 - Moderate 2 - Severe 9 - Unknown

- A. During descent
- B. During landing

## 16. PARACHUTE DAMAGE - Give number of:

- |                            |                          |
|----------------------------|--------------------------|
| Severed shroud lines _____ | Torn panels, major _____ |
| Missing panels _____       | Torn panels, minor _____ |

## 17. CAUSE OF PARACHUTE DAMAGE

- |  |   |
|--|---|
| 1 - Opening shock <input type="checkbox"/>           | 6 - In trees <input type="checkbox"/>         |
| 2 - Fouled on ejection seat <input type="checkbox"/> | 7 - Dragging <input type="checkbox"/>         |
| 3 - Fouled on A/C <input type="checkbox"/>           | 8 - Other (describe) <input type="checkbox"/> |
| 4 - Fire <input type="checkbox"/>                    | 9 - Unknown <input type="checkbox"/>          |
| 5 - On landing <input type="checkbox"/>              |   |

## 18. FOUR LINE CUT

1-Yes 0-No 8-Partly 9-Unk

- |                            |  |  |  |
|----------------------------|--|--|--|
| Attempted _____            |  |  |  |
| Succeeded _____            |  |  |  |
| Stopped Oscillations _____ |  |  |  |
| Slowed Descent _____       |  |  |  |
| Provided Steering _____    |  |  |  |

## 19. DIRECTION FACED AT CHUTE LANDING

- |   |  |
|---|--|
| 1 - Directly facing <input type="checkbox"/>    | 4 - Quartering, back <input type="checkbox"/>  |
| 2 - Facing away <input type="checkbox"/>        | 5 - Directly sideways <input type="checkbox"/> |
| 3 - Quartering, facing <input type="checkbox"/> | 9 - Unknown <input type="checkbox"/>           |

## 20. LANDING CONDITIONS

- A. Total weight under parachute: \_\_\_\_\_ lbs
- B. Surface wind: \_\_\_\_\_ knots
- C. Dragged by chute
- 1 - yes ☐
- 0 - no ☐
- D. Distance dragged: \_\_\_\_\_ yards

## 21. PARACHUTE LANDING POSITION TECHNIQUES

- |  |  |
|--|--|
| A. 0 - Could not see <input type="checkbox"/>  | C. 1 - Muscles tensed <input type="checkbox"/>     |
| 1 - Looking ahead <input type="checkbox"/>     | 2 - Muscles too tense <input type="checkbox"/>     |
| 2 - Looking down <input type="checkbox"/>      | 3 - Too relaxed <input type="checkbox"/>           |
| 8 - Other <input type="checkbox"/>             | 8 - Other <input type="checkbox"/>                 |
| 9 - Unknown <input type="checkbox"/>           | 9 - Unknown <input type="checkbox"/>               |
| B. 1 - Fell obliquely <input type="checkbox"/> | D. 1 - Proper position <input type="checkbox"/>    |
| 2 - Fell backward <input type="checkbox"/>     | 2 - Knees locked <input type="checkbox"/>          |
| 3 - Fell forward <input type="checkbox"/>      | 3 - Arms in poor position <input type="checkbox"/> |
| 8 - Other <input type="checkbox"/>             | 8 - Other <input type="checkbox"/>                 |
| 9 - Unknown <input type="checkbox"/>           | 9 - Unknown <input type="checkbox"/>               |

## 22. DEPLOYED BEFORE LANDING

- |                 |         |        |             |
|-----------------|---------|--------|-------------|
|                 | 1 - yes | 0 - no | 9 - unknown |
| A. Survival kit |         |        |             |
| B. Life raft    |         |        |             |
| C. Life vest    |         |        |             |

## 23. CANOPY DEFLATION POCKETS

- 0 - Not effective in collapsing chute ☐
- 1 - Aided in collapsing chute ☐
- 7 - Not installed ☐
- 8 - Unknown if installed ☐
- 9 - Unknown if effective ☐

ME

SERIAL NO.

A/C

BUNO

VIII SURVIVAL AND RESCUE

1. SURVIVAL TRAINING
- \* Use code at right to indicate the role  
this person's training played in survival:
- 0 - Not a factor  
1 - Definitely helped  
2 - Possibly helped
- 3 - Lack of training definite factor  
4 - Lack of training possible factor  
9 - Role unknown

Type Training	Course and Sponsor	Place Accomplished	Completed		*Role
			Mo.	Year	
Water Survival:					
Maintenance swim					
Dilbert Dunker					
Parachute drag					
Immersed cockpit					
Immersed seat					
Jungle Survival					
Arctic Survival					
Desert Survival					
Mountain Survival					
Survival (General)					

2. CONDITIONS PREVAILING AT SURVIVAL/RESCUE SITE. IF WIDELY VARIABLE, GIVE RANGE.
- A. Water temperature °F. F. - Terrain: 5 - Water
- B. Air temperature °F. 1 - Open ground 6 - Ice/Snow
- C. Surface winds Knots 2 - Woods/jungle 7 - Swamp
- D. Wave height Feet 3 - Mountains 8 - Other
- E. Wave frequency per min. 4 - Desert 9 - Unknown 5 - Snow
- G. Weather:
- 1 - Clear 6 - Sleet
- 2 - Overcast 7 - Hail
- 3 - Fog 8 - Other
- 4 - Rain 9 - Unknown
- 5 - Snow

3. TIME LAPSE SEQUENCE FOR RESCUE EVENTS (Give time lapse in hours and minutes from time of mishap)
- For actual rescue vehicle and personnel and others who took an active part in the rescue sequence but did not actually recover this individual. See Instructions for details.

	Actual Rescuer	Other Participant	Other Participant	Light Conditions			
				Day	Night	Dawn	Dusk
A. Rescue personnel notified that mishap had occurred							
B. Rescue vehicle departed							
C. This individual located by rescue personnel							
D. This individual physically reached by rescue vehicle/personnel							
E. This individual actually aboard rescue vehicle or rescue attempt abandoned							
F. Rescue completed (person returned to station, hospital, etc.)							

4. A. Time this individual spent in water: hrs. min.
- B. Time this individual spent in life raft: hrs. min.

5. At time of rescue alert, distance in miles from mishap site to:
- A. Actual rescue vehicle B. Nearest rescue vehicle

6. PERSONNEL/VEHICLES PARTICIPATING IN RESCUE

- A. Vehicle performing actual pickup of this person
- Type/Model:
- Location when alerted:
- Duty when alerted:
- B. Did rescue personnel leave vehicle to assist in rescue?
- 1 - Yes 0 - No 9 - Unknown
- If so, how?
- A - Parachuted
- B - Jumped without parachute
- C - Descended line/ladder/net
- D - Lowered by hoist
- E - Normal ground/water
- Y - Other
- C. List other vehicles participating in rescue effort:
- 2nd vehicle in Item 3.
- 3rd vehicle in Item 3.
- Others who stood by ready to render assistance if required:
- D. Number search and rescue hours.

9. ALERTING/COMMUNICATIONS PROBLEMS

- A - Poor radio reception
- B - Telephone line busy
- C - Poor radio discipline
- D - Aircraft radio/IFF equipment inoperative
- E - Poor radio procedures
- Y - Other

10. DELAYS IN DEPARTURE OF RESCUE VEHICLES

- A - Vehicle operator not available
- B - Vehicle not ready
- C - Vehicle crew not available
- D - Communications breakdown
- E - Completing previously assigned duties
- F - Lack of information on crash site
- G - Nature of terrain
- H - Weather
- Y - Other

11. RESCUE VEHICLE PROBLEMS ENROUTE

- A - Headwind
- B - Poor visibility
- C - High sea state
- D - Mechanical problems
- E - Nature of terrain
- F - Other obstructions (fences, etc.)
- G - Rescuers lost
- H - Weather
- Y - Other

12. PROBLEMS IN LOCATING INDIVIDUAL (or keeping in sight)

- A - Heavy seas
- B - Trees
- C - Fog/clouds
- D - Precipitation
- E - Darkness
- F - Radio interference
- G - Confusion due to other lights
- H - Malfunction of directional equipment
- J - Lack of correct information on location of survivor
- K - Inability to visually distinguish survivor from terrain
- L - Loss of radio/radar contact
- M - Survivor's failure to use signalling equipment
- Y - Other

7. RESCUE EQUIPMENT USED (Use numbers to show sequence)

- A - Sling
- B - Seat
- C - Cargo net
- D - Rope
- E - Life ring
- F - Basket
- G - Boom net
- H - Davit
- J - Raft
- K - Webbing cutters
- L - Chicago grip
- M - Grapnel
- N - Boarding ladder
- P - Knife/axe/saw
- Q - Makeshift carrier/support
- R - First aid equipment
- S - Tree penetrator seat
- T - Helicopter platform
- U - Stretcher
- V - Cable cutters
- W - Helicopter rescue boom
- Y - Other (describe)

8. RESCUE ALERTING MEANS - (Use numbers to show sequence)

- A - Witnessed
- B - Radar surveillance
- C - Overdue report to SAR
- D - Airborne rapid relay
- E - Crash phone
- F - Other telephone
- G - Radio May-day call
- H - Radio survival type
- J - Other radio report
- K - Visual signalling equipment
- L - Audio signalling equipment
- M - Survivor report
- N - Loss of radio contact
- P - Smoke/fire-crash scene
- Y - Other (describe)

## 13. SURVIVAL AND RESCUE (Cont'd)

Consult instructions for listing of specific locator means and enter under appropriate categories. Use numbers to indicate sequence of observance.

[illegible]

## 14. SURVIVAL PROBLEMS ENCOUNTERED BY THIS PERSON

- |                                   |                          |   |                          |   |                          |
|-----------------------------------|--------------------------|---|--------------------------|---|--------------------------|
| #1 - Inadequate flotation gear    | <input type="checkbox"/> | #9 - Pulled down by sinking parachute     | <input type="checkbox"/> | 18- Topography (swamps, mountains, deserts, etc.) | <input type="checkbox"/> |
| #2 - Inadequate cold weather gear | <input type="checkbox"/> | #10 - Entanglement (other than parachute) | <input type="checkbox"/> | 19 - Darkness                                     | <input type="checkbox"/> |
| #3 - Lack of signalling equipment | <input type="checkbox"/> | 11 - Unfamiliar with procedures/equipment | <input type="checkbox"/> | 20 - Thrown out of raft                           | <input type="checkbox"/> |
| #4 - Lack of other equipment      | <input type="checkbox"/> | 12 - Confused, dazed, disoriented         | <input type="checkbox"/> | 21 - Hampered by helo downwash                    | <input type="checkbox"/> |
| #5 - Entanglement (parachute)     | <input type="checkbox"/> | 13 - Incapacitated by injury              | <input type="checkbox"/> | 22 - Problem boarding rescue vehicle              | <input type="checkbox"/> |
| #6 - Dragging (parachute)         | <input type="checkbox"/> | 14 - Poor physical condition              | <input type="checkbox"/> | 23 - Thirst                                       | <input type="checkbox"/> |
| #7 - Parachute hardware problem   | <input type="checkbox"/> | 15 - Exposure (heat, cold, sunburn, etc.) | <input type="checkbox"/> | 24 - Hunger                                       | <input type="checkbox"/> |
| #8 - Entrapment in aircraft       | <input type="checkbox"/> | 16 - Fatigue                              | <input type="checkbox"/> | 25 - Insects, snakes, animals, etc.               | <input type="checkbox"/> |
|                                   |                          | 17 - Weather                              | <input type="checkbox"/> | 26 - Sharks                                       | <input type="checkbox"/> |
| 98 - Other _____                  |                          |   |                          |   |                          |

## 15. PROBLEMS THAT COMPLICATED RESCUE OPERATIONS

- |  |                          |   |                          |
|--|--------------------------|---|--------------------------|
| #1 - Failure of rescue vehicle (mechanical problems)   | <input type="checkbox"/> | 15 - Panic/inappropriate actions of person being rescued                | <input type="checkbox"/> |
| #2 - Inadequacy/lack of rescue vehicle                 | <input type="checkbox"/> | 16 - Rescue vehicle accident  | <input type="checkbox"/> |
| #3 - Failure of rescue equipment (hoist, etc.)         | <input type="checkbox"/> | 17 - Communications problems  | <input type="checkbox"/> |
| #4 - Inadequacy/lack of rescue equipment               | <input type="checkbox"/> | 18 - Drag/entanglement by deployed parachute                            | <input type="checkbox"/> |
| #5 - Inadequacy of rescue personnel knowledge/training | <input type="checkbox"/> | 19 - Topography (rough seas, mountains, etc.)                           | <input type="checkbox"/> |
| #6 - Inadequate medical equipment                      | <input type="checkbox"/> | 20 - Interference from other vehicles                                   | <input type="checkbox"/> |
| #7 - Inadequate medical facilities                     | <input type="checkbox"/> | 21 - Victim pulled away by extreme forces                               | <input type="checkbox"/> |
| #8 - Vehicle operator factor (poor procedure)          | <input type="checkbox"/> | 22 - Weather  | <input type="checkbox"/> |
| #9 - Rescue crewman assist hesitancy                   | <input type="checkbox"/> | 23 - Darkness   | <input type="checkbox"/> |
| #10 - Fire/explosion                                   | <input type="checkbox"/> | 24 - Weight/drag problem not due to parachute                           | <input type="checkbox"/> |
| #11 - Entrapment in aircraft                           | <input type="checkbox"/> | 25 - Hampered by personal/survival equipment of person being rescued    | <input type="checkbox"/> |
| #12 - Physical limitations of rescue personnel         | <input type="checkbox"/> | 26 - Floating debris  | <input type="checkbox"/> |
| #13 - Physical limitations of person being rescued     | <input type="checkbox"/> | 27 - Primary rescuer delayed awaiting futile attempts by other rescuers | <input type="checkbox"/> |
| #14 - Carelessness by rescue personnel                 | <input type="checkbox"/> | 28 - Hampered by helicopter downwash                                    | <input type="checkbox"/> |
| #98 - Other (specify) _____                            |                          |   |                          |

## 16. INDIVIDUALS PHYSICAL CONDITION

16. INDIVIDUALS PHYSICAL CONDITION	During Rescue	After Rescue
Fully able to assist	1 -	A-
Partially able to assist	2 -	B-
Immobile or unconscious	3 -	C-
Fatal on recovery-due to injuries		D-
Fatal on recovery-drowned		E-
Recovered alive-died from injuries		F-
Lost during rescue attempt-presumed drowned		G-
Lost during rescue attempt-apparently injured fatally or drowned		H-

## 17. CHECK CATEGORIES OF FACTORS THAT HELPED RESCUE/RECOVERY

- |   |                          |                                  |                              |
|---|--------------------------|----------------------------------|------------------------------|
| 1 - Rescue personnel training             | <input type="checkbox"/> | Availability of rescue equipment | 6 - <input type="checkbox"/> |
| 2 - Training of person to be rescued      | <input type="checkbox"/> | Suitability of rescue equipment  | 7 - <input type="checkbox"/> |
| 3 - Aircraft emergency escape means       | <input type="checkbox"/> | Survivor's techniques            | 8 - <input type="checkbox"/> |
| 4 - Personal equipment releases/actuators | <input type="checkbox"/> | Coordination of rescue efforts   | 9 - <input type="checkbox"/> |
| 5 - Rescue procedures/pre-accident plans  | <input type="checkbox"/> |                                  |                              |

AME

SERIAL NO.

A/C

BUNO

IX

FLIGHT SURGEON'S COMMENTS, ANALYSIS AND RECOMMENDATIONS

Flight Surgeon participated fully in investigation Yes <input type="checkbox"/> No <input type="checkbox"/>		Number of hours spent _____	Date of Report _____
Flight Surgeon participated fully in Board proceedings Yes <input type="checkbox"/> No <input type="checkbox"/>		Number of hours spent _____	No. Reports prepared _____
Flight Surgeon's Name and Grade _____		Duty Station _____	Signature _____
Name of Individual _____		Service No. _____	



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STATE OF NEW YORK

IN SENATE

JANUARY 1, 1901

REPORT

OF THE

COMMISSIONERS OF THE LAND OFFICE

IN RESPONSE TO A RESOLUTION

PASSED BY THE SENATE

APRIL 1, 1899

ALBANY:

JOHN B. LANE, PRINTER

1901

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100

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None

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1912

and a description of the progress made during the year

2.

The second part of the report

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state of the country at the end of the year

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state of the country at the end of the year

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